Is It Retirement or Unemployment?

The Constrained Labour Supply of Older Canadians

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Chapter 1

Overview

This paper starts from the observation that there has been a dramatic decline in recent years in the labour force participation of older men. In 1973, 88.5% of men between the ages of 45 and 64 were in the labour force, but by 1986 their labour force participation rate had fallen to 80.7%.[1] Coincidentally, the Canadian economy has seen a dramatic increase in the aggregate unemployment rate, a trend which has affected older, as well as younger, workers. In 1986, those jobless males over 45 who continued to look actively for work had an average interrupted duration of unemployment of 31.0 weeks, while the unemployment rate among men and women aged 45 to 64 was 6.8%.[2] This paper therefore asks the question: "How important has labour market demand been as a determinant of the labour market behaviour of older Canadians?" or, to put it another way, if we observe that older Canadians have left the paid labour force, does this represent "retirement" or "unemployment"?

The issue of involuntary labour force withdrawal is important for both the equity and the efficiency of the Canadian labour market. Involuntary

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[1]The labour force participation rate for women between the ages of 45 and 64 has increased from 37.4% in 1973 to 47.4% in 1986, reflecting the general trend to increased labour force participation by women. Aggregate participation rates for older women are the resultant of two opposing forces--the decreased labour force participation which comes with age, and the increased labour force participation of women.

[2]The text refers to data for 1986 drawn from the Labour Force Survey, since later analysis will center on labour market outcomes in 1986. However, it is worth noting that the general decline in unemployment rates over the 1986/88 period has produced a decline in aggregate unemployment for older Canadians (to 5.4% among those aged 45-64) and a decrease in the duration of unemployment (to 29.9 weeks for men over 45). At the same time, the decline in older male labour force participation rates has ceased--the labour force participation rate of men between 45 and 64 was 80.7% in June 1988--identical to that in 1986.

unemployment which ends in labour force withdrawal produces severe psychological stress for older Canadians, at a time of their lives when "starting over" is very difficult.[2] In addition to the current financial losses imposed by unemployment, older Canadians also face a future loss in pension entitlement produced by the combination of imperfect vesting of private pension plans, decreased years of pensionable service and the fact that pension benefits are normally calculated on the base of peak earnings years (usually ages 55-64), but job-losers have a lower base of pensionable earnings. Since the financial and psychological costs of unemployment and involuntary labour force withdrawal are likely to be particularly acute for older workers, and since all of us look forward to being "older workers" at some point in the future, the plight of older workers represents a very real social concern.

From the point of view of aggregate economic efficiency, the extent of involuntary labour force withdrawal is important because it can influence our estimates of potential labour supply in the Canadian economy. Compared to the 1970s, the 1980s have seen a dramatic decline in the rate of growth of the Canadian labour force and it is easy to predict that the relative size of the youth population will continue to shrink in the 1990s. The issue for macroeconomic policy makers is the extent of the decline in the warranted rate of growth of the Canadian economy which this implies. If recent trends in labour force participation are in part due to involuntary labour force withdrawal by older Canadians because of inadequate demand for

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[2]For a discussion of the adverse impacts of unemployment on mental and physical health, and the particularly strong adverse impacts among older workers, see Brenner (1973). Ketso (1988) demonstrates the causal role which unemployment plays as a determinant of illness.

labour, then there is more room for stimulative macroeconomic policy, since one can expect labour market tightness to be partially offset by a re-entry into the labour force of older Canadians.[4] However, if declining labour force participation rates in fact reflect voluntary retirement decisions, then it is more likely that higher rates of labour market demand will produce inflationary pressures on wages. As the "big generation" of baby boomers born between 1946 and 1960 ages, it will become increasingly important to know whether their withdrawal from the labour force is irrevocable, or dependent on aggregate labour market demand.

This chapter does not pretend to offer a survey of the economic literature on retirement--both because this has been done elsewhere (e.g., Lazear, 1986) and because it would represent a major enterprise in itself. However, it is worthwhile to state the innovations of the current paper and the reasons why it diverges from some of the literature already in place.

In general, the labour supply literature emphasizes very heavily the labour/leisure choices faced by individuals, and the incentives to which those choices respond.[5] The aftertax hourly wage rate represents the incentive which the market offers to increase hours of paid labour supply, while the marginal utility of leisure depends on personal and family characteristics. A utility maximizing individual will supply labour up to the point where the marginal utility of leisure is equal to the wage.

The "incentives" issue which is of particular relevance to older workers is pension entitlements. Those workers who are covered by private

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[4]The issue of whether, and to what extent, involuntary withdrawal represents a reversible process remains to be examined--the second year of the LMAS could shed some light on this.

[5]Killingsworth (1983) provides an exhaustive survey.

pension plans receive part of their hourly wage as a deferred payment. However, the magnitude of this deferred payment depends on the formula which defines pension benefits payable (and which differs, for example, between money purchase and defined benefit pension plans), the period of time over which the individual expects pension benefits to be received and the discount rate which the individual may attach to future income. The issues surrounding the modelling of pension benefit entitlement are many and complex and have been the subject of work by Bodie et. al. (1988, 1987), Wise (1985), Burkhauser (1979) and many others.

However, only a minority of the paid labour force are in fact covered by private pension plans. For most workers, the Canada Pension Plan, in combination with the Old Age Pension/Guaranteed Income Supplement and any private savings, forms the basis for retirement income. Those who consider voluntary early retirement face a tradeoff between current money earnings plus the increase in future CPP benefits obtainable from an additional year of employment versus the CPP benefits now obtainable plus the attractions of early retirement. (And during a period when increases in the money wage have typically fallen short of price inflation, the potential early retiree must consider the fact that early retirement implies early indexing of the CPP to the consumer price index).

Incentives, however, can only be part of the story since any model of individual utility maximization must specify some set of constraints to which that maximization is subject. In the literature on retirement behaviour, two sorts of constraints have often been discussed. The implicit contract perspective (e.g., Lazear (1979)) has argued that individuals chose among "lifetime" implicit contract at different

employers, which specify a future date of mandatory retirement, as a mechanism to ensure that workers have an incentive to continued good job performance (since their wages increase steadily over time) yet the firm avoid paying wages greater than productivity over the term of the bargain. In this perspective, mandatory retirement policies, at any point in time, represent a constraint on the labour supply of older workers--but one to which they had earlier agreed. Similarly, authors such as Azariadis (1976) and Hutchens (1983) have argued that individuals accept job offers at those firms which offer the combination of wages and future layoff probability that maximizes their personal utility.

The "implicit contracts" perspective can be seen as having a supply side orientation in that it argues that workers choose jobs at those firms which offer the best combination of wages over time, layoff probability and date of mandatory retirement. Differences in labour market outcomes among workers are presumed to reflect different choices, whose explanation is sought in differences in the personal characteristics of individual workers.

The characteristic of particular relevance for the voluntary early retirement decision is the health/illness status of individuals. Breslaw and Stelcner (1987) have demonstrated, using Canadian data, the importance of health status as a determinant of retirement behaviour--a finding echoed by Burtless et. al. (1987) using US data.

However, this paper emphasizes the role played by demand side variables in the permanent job separations of older workers, and it considers the probability of that aggregate supply of labour of individuals will be constrained by labour market demand. It is, therefore, in the

broad tradition of "constrained labour supply models". Examples of this genre are Ashenfelter (1980) and Morrissette (1988), who both used aggregative time series data, and Wales and Woodland (1980), Ham (1982) Phipps (1987) and Ketso (1988), who used microdata. The basic perspective underlying these empirical models is the theoretical idea (made respectible by Malinvaud and Keynes) that the labour market may often be in disequilibrium in the sense that the demand for labour may fall short of the available supply of labour, for extended periods of time. If this is true, then available work is a rationed commodity, and some people may not receive all that they might desire at going prices. The basic innovation of this paper is to approach the labour market behaviour of older Canadians from this perspective.

Chapter 2

Simple Statistics on Labour Market Outcomes

Chapter 3 of this report will discuss the determinants of the probability of retirement, of exit from the labour force and of under employment among older Canadian workers. It will estimate a model of the determinants of hours of labour supply, given the probability of labour market constraint, and will present some evidence for a "backward bending supply curve of labour"--i.e., it will argue that, controlling for other variables, hours of labour supply first increase and then decrease with rising wages.

However, in order to place these multi-variate results in context, this chapter will present and discuss some simpler statistics on the variables which will enter the multi-variate analysis of chapter 3. Table 2.1, for example, presents the distribution of hourly wage rates for employed Canadians by age and sex cohort. It illustrates the considerably higher hourly wages received by older male workers, 45% of whom earned over $14 per hour in 1986. Some 27% of younger male workers earned over $14 per hour and table 2.1 is illustrative of the increase in hourly wages which male workers typically experience over the life cycle. By contrast, relatively few female workers earn high hourly wages and the proportion does not increase much with age--12.2% of female workers aged 16-44, and 15.4% of those aged 45-69, earned over $14 an hour.

At the other end of the wage scale, almost a quarter (24.4%) of older women workers earned less than $6 per hour, while only 7.9% of older male workers were in this category. In chapter 3 we will examine the determinants of hours of labour supply by age and sex cohort, but Table 2.1

Table 2.1

Percentage Wage Distribution in 1986 (Job 1): Canada

	Males		Females		All
Hourly Wage Rate	16-44	45-69	16-44	45-69	
Up to 3.99	3.7	1.8	6.8	4.2	4.6
4.00 to 4.50	6.9	1.0	12.1	5.1	7.8
4.51 to 5.00	5.7	1.7	8.3	6.1	6.1
5.01 to 6.00	6.9	3.4	9.4	9.0	7.5
6.01 to 8.00	14.0	7.1	17.7	18.3	14.8
8.01 to 10.00	13.4	12.6	15.5	19.6	14.6
10.01 to 14.00	22.5	27.2	18.2	22.2	21.6
14.01 to 18.00	15.4	21.7	7.9	9.5	13.0
18.01 to 22.00	7.1	11.9	2.6	3.2	5.8
22.01 and over	4.4	11.7	1.7	2.7	4.3
Percentage of Respondents	41.1	13.4	35.9	9.6	100

is a useful reminder that the monetary incentives to labour supply and labour force participation differ dramatically by age and sex cohort.

Table 2.2 presents data on the supply of hours of work by paid employees in Canada in 1986. Line 1 reports the percentage of each demographic cohort who had some paid employment in 1986, and illustrates the dramatic decline in paid employment as individuals age over the years 45+. Line 2 presents the average hours worked by those with some paid employment in 1986. One can note that average hours of employment peak between the ages of 45 and 54 for males, but decline continually with age among women. In this table we cannot distinguish between "age" and "cohort" effects and it could be that the behaviour of older women now partly reflects a pure "cohort effect", since women aged 55-64 in 1986 would typically have decided on career paths in the late 1940's, when participation in the paid labour force by women was much less widespread than it has been in subsequent decades.

Moreover, averages can often be fairly deceptive statistics. On an average basis, line 2 of Table 2.2 indicates a steady decline in hours per year as with greater age. But this decline in average hours does not arise from any general tendency of employed individuals to reduce gradually their hours of work. A trend to a shift from full-time to part-time work is only faintly discernible in Table 2--the proportion of the cohort with relatively few hours changes only slightly as cohorts age. The major issue in the data is the very significant drop with age in the percentage working over 2,000 hours per year (i.e., full time full year) and the coincident rise in the percentage working zero hours.

Table 2.2

Distribution of Hours of Work in 1986: Canada

	Males				Females			
	16-44	45-54	55-64	65-69	16-44	45-54	55-64	65-69
Percentage with some Employment	84.3	74.4	56.0	16.5	73.1	57.9	32.3	7.0
Average Annual Hours Worked by those employed	1438.7	1477.6	1029	239.8	1014.2	904	472.3	81.7
Percentage of People by Annual Hours Worked								
0	15.7	25.6	44.0	83.5	26.9	42.1	67.7	93.0
1≤ 400	7.1	1.9	2.8	2.0	9.8	4.6	3.7	1.2
401-800	8.7	3.0	3.9	3.0	11.5	6.1	4.1	1.4
801-1200	6.5	2.6	3.7	1.7	8.5	6.3	4.0	1.3
1201-1600	7.1	4.4	4.1	2.8	8.6	7.7	4.2	0.8
1601-2000	9.6	9.3	5.5	0.8	12.0	11.3	5.2	0.8
2001 and over	45.2	53.2	36.0	6.2	22.6	21.9	11.1	1.4
Fraction of All Hours of Employment	0.439	0.096	0.059	0.005	0.31	0.059	0.029	0.002

Finally, Table 2.2 can be read as sounding a note of caution. The final line of Table 2 presents the fraction of all the hours of paid employment worked in 1986 which was contributed by each particular age/sex cohort. In 1986, 74.9% of all hours of paid employment were worked by individuals under 45 years of age. The cohorts which we focus on in this paper (i.e., 45+) accounted for only about one quarter of the work hours of the Canadian labour force.

The motivation for this paper is that the relative importance of older cohorts will increase in future years, as the "big generation" of the baby boom born between 1946 and 1960 ages. One therefore can anticipate that the determinants of labour supply among older Canadians will be of great interest for public policy discussion in the future. However, <u>at present</u> older Canadians supply relatively little of the paid employment of the Canadian economy. The phenomenon of interest in this paper is retirement/withdrawal from the labour force, and this occurs most strongly among those aged over 55. In 1986 males over the age of 55 supplied only approximately 6% of Canadian labour hours while females over 55 supplied another 3% of total labour hours. Hence, public policy which affects the labour supply of older cohorts can only have a relatively small impact on aggregate labour supply, <u>at the present time</u>. The relative number of older Canadians will increase in relative importance in future years, and with it the social importance of policy which affects their labour supply will also increase--but we are starting from a low base.

Table 2.3

The Distribution of Unemployment
by Weeks of Unemployment Experienced
A--Total Weeks Unemployment in 1986: Canada
(Official Definition)*

		Males		Females		All
		16-44	45-69	16-44	45-69	
Unemployment Experienced Weeks						
0	- % people	77.5	91.0	79.8	92.8	83.0
1-4	- % weeks	3.0	1.1	4.1	1.8	3.1
	- % unemployed	21.3	10.6	25.8	16.1	21.8
5-8	- % weeks	4.1	1.3	4.9	1.9	3.9
	- % unemployed	10.8	4.9	11.8	6.5	10.4
9-17	- % weeks	5.8	3.0	6.8	4.3	5.7
	- % unemployed	10.7	8.2	11.6	10.3	10.8
13-26	- % weeks	28.6	21.8	27.8	19.2	26.7
	- % unemployed	29.0	31.0	26.0	24.7	27.7
27-52	- % weeks	58.5	72.7	56.4	72.9	60.6
	- % unemployed	28.1	45.3	24.8	42.5	29.3

* Weeks of Unemployment = total weeks in 1986 not employed but actively searching for work.

B--Total Weeks Unemployment in 1986: Canada
(Alternative Definition)*

		Males		Females		All
		16-44	45-69	16-44	45-69	
Unemployment Experienced Weeks						
0	% people	74.7	89.3	76.9	91.5	80.6
1-4	- % weeks	2.2	1.1	3.3	1.2	2.4
	- % unemployed	19.3	10.4	22.4	12.2	19.2
5-8	- % weeks	4.3	1.7	4.9	2.4	4.0
	- % unemployed	13.3	6.7	13.5	9.1	12.5
9-17	- % weeks	5.0	2.9	6.0	3.6	5.0
	- % unemployed	10.2	7.6	10.9	9.4	10.2
13-26	- % weeks	26.4	21.8	26.3	17.7	25.0
	- % unemployed	28.5	30.9	26.0	24.4	27.4
27-52	- % weeks	62.1	72.7	59.6	75.1	63.7
	- % unemployed	28.6	44.4	27.2	45.0	30.6

* Weeks of unemployment = total weeks not employed in 1986 and actively searching for work or wanting work + available for work

However, one of the reasons for examining the labour market experience of older workers is the suspicion that unemployment might represent a very different phenomenon among older workers than among younger workers. Older workers may have skills which are becoming obsolescent with greater rapidity than in the past, and may therefore be being "thrown on the scrap-heap" of involuntary unemployment by economic and technological change with greater frequency than in the past. If so, such unemployment presents a major social issue, both for the older cohorts who are now affected and the younger cohorts who see what they themselves can look forward to. Table 2.3 examines the distribution of total weeks of unemployment, among unemployed people and by weeks of unemployment experienced in 1986, for different demographic groups. Reading across the first panel of Table 2.3 one can note, for example, that 77.5% of all males aged 16-44 experienced 0 weeks of unemployment, and that the probability of having no unemployment in 1986 increases with age. Unemployment is, as is well known, rarer among older workers.

However, lines 2 through 11 of Table 2.3 indicate the greater concentration of unemployment among older cohorts. Line 2 presents the percentage of all weeks of unemployment contributed by people with short duration unemployment in 1986, (i.e., 1-4 weeks). Among males less than 45, 3% of all unemployment weeks were experienced by the 21.3% of all unemployed individuals with less than a month of total unemployment, while only 1.1% of unemployment weeks among older male workers was contributed by people in this category, who were 10.6% of the older unemployed. Line 3 presents the percentage of all unemployed people who had less than four weeks unemployment, which is considerably greater among younger cohorts, at

21% of young unemployed males and 25% of young unemployed females than among workers aged over 45, for whom short total durations were considerably rarer, at 10.6% for males and 16.1% for females.

Reading down Table 2.3, one can note the greater concentration of unemployment within older cohorts. Men who spent more than half of 1986 unemployed (line 11) accounted for 72.7% of all the unemployment experienced by older male workers in 1986, but 58.5% of all the unemployment experienced by males 16-44. In 1986, 45.3% of older male workers who experienced some unemployment had over 6 months of unemployment in total, while 28.1% of males 16-44 with some unemployment had total durations over 6 months.

However, those individuals who face severe difficulties in obtaining employment, such as older workers, may become discouraged and cease active job search, while still being "unemployed" in the sense of being without work, but willing and able to accept employment at existing wage rates. Since one of the issues to be discussed in this paper is the distinction between voluntary and involuntary "retirement", it is desirable to look also at alternative definitions of unemployment. Table 2.3(b) therefore presents the same breakdown as Table 2.3(a), but using an alternative definition of "unemployment". In Table 2.3(b) a week of unemployment is a week with no paid employment when an individual either searched actively for paid employment or stated that they wanted work and were available for work. As one would expect, the concentration of unemployment, and particularly the concentration of unemployment among older cohorts, increases under this more inclusive definition of unemployment--but the difference between Tables 2.3(a) and 2.3(b) is not huge.

Table 2.4

Number of Jobs Distribution and Job 1 Tenure in 1986. Canada.

	Males		Females		All
	16-44	45-69	16-44	45-69	
% people with 0 Employer	6.7	28.0	21.4	54.9	22.6
Number of Employers					
1	77.9	91.6	78.2	92.0	82.9
2	16.8	7.3	16.8	6.7	13.4
3	4.0	0.8	3.7	0.9	2.7
4	0.9	0.3	0.9	0.2	0.6
5 and over	0.4	0	0.4	0	0.3
	100%	100%	100%	100%	100%
Job 1 Tenure (Years)					
<1	25.8	9.4	29.7	11.8	23.2
1-5	35.3	17.8	39.8	25.2	33.2
5-10	19.5	14.1	18.0	19.9	18.2
10-20	16.6	24.9	11.2	27.5	17.1
20 and over	2.7	33.9	1.3	15.6	8.3
Average Job 1 Tenure (Years)	5.29	15.07	4.16	10.39	6.905

Unemployment is rarer among older workers than among younger workers, but its impact is more concentrated. In this paper we want to distinguish between the labour force withdrawal of older workers which arises from extended involuntary unemployment and the withdrawal which arises from voluntary retirement. Hence we would like to know if the greater concentration of unemployment among older workers can be explained by reference to current theories of unemployment.

"Search" models of unemployment [for a recent survey, see Mortenson (1986)] have argued that unemployment is the time people spend looking for an acceptable job, so Table 2.4 presents data on the distribution of the number of jobs held in 1986. Panel 1 of Table 2.4 illustrates the well-known fact that job mobility is relatively rare among older workers. Over 20% of employed men under 45 had more than 1 job in 1986, but less than 9% of those over 45. Panel 2 of Table 2.4 presents another dimension of the same basic issue, and illustrates the much greater job tenure of older workers. Almost 60% of older male workers had, in 1986, been in their job for more than 10 years--over a third had been there more than 20 years. Job tenure is lower for women, but 43% had more than ten years tenure. It would be very hard to claim that greater job mobility can account for the greater concentration of unemployment among older workers.

The Lilien (1982) and Samson (1985) models of aggregate unemployment emphasize the role played by inter-industry shifts in the demand for labour as a determinant of aggregate unemployment. Older workers may be more at risk in this process. Table 2.5 therefore compares the industry of employment recorded for the first job held by an individual in 1986 with the industry of unemployment of their subsequent job. [Note that job-

losers who could not locate a subsequent job by the end of 1986 are omitted from Table 2.5]. The first line of Table 2.5 can be read as an indication of the relatively high rate of inter-industry mobility of labour in Canada, and the fact that such mobility is concentrated among younger workers.[6] Reading Tables 2.4 and 2.5 together indicates that many of those who change employers also change industry of employment. Over all, Table 2.5 indicates that 13.9% of those employed changed their industry of employment in 1986, while Table 2.4 indicates that 17.1% of the employed had more than 1 employer--i.e., about 4/5 of those who changed employers in 1986 also changed their industry of employment. (A fraction which is somewhat higher among older men then among younger).

The interesting aspect of Table 2.5 is that most of those individuals who changed their industry of employment in 1986 evidently had lined up their new jobs while still at their old employer. Overall, 2/3 of those people who changed industry of employment had no intervening weeks of joblessness.[7] Overall, 65.4% of those who changed industry of employment went directly from their first to their second job. An unknown fraction of the remaining 34.6%, who had some weeks of non-employment between their jobs, would be people who arranged a new job but chose to take some weeks

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[6]Since inter-industry mobility declines dramatically with job tenure, one should not read Table 2.5 as indicating an "age effect", but as reflecting the greater job tenure of older workers. The determinants of inter-industry job mobility are discussed in Osberg (1988).

[7]A skeptical reader might suspect that Table 2.5 confuses "moonlighting", perhaps in a different industry, with actual changes of employment. Since the Labour Market Activity Survey contains information on the week in which each job started and finished. Table 5 defined a "change" of industry of employment as occurring when the first and second jobs held by an individual are not in the same industry, but also do not overlap in time--i.e., at no point are held concurrently.

Table 2.5

Inter-Industry Mobility and Joblessness in 1986: Canada

	Males		Females		All
	16-44	45-69	16-44	45-69	
Percentage of those employed with industry change	16.9	7.0	15.2	5.6	13.9
Percentage of those changed industry with intervening joblessness	34.9	23.8	36.5	29.5	34.6
Percentage of those changed industry without intervening joblessness	65.1	76.2	63.5	70.5	65.4

Table 2.6(a)

Labour Force Status in 1986 in Canada: Males

LF Status in January	16	17-19	20-24	25-34	35-44	45-54	55-64	65-69
Employed	22.6	36.4	60.8	81.5	88.5	86.7	65.4	25.0
Unemployed with job search	3.6	6.1	11.0	9.0	5.7	5.2	4.9	0.4
Unemployed without job search	9.2	3.9	1.7	1.3	0.7	1.1	1.1	0.5
Not in the labour force	69.7	53.8	26.4	8.2	5.0	7.1	28.6	74.1
Percentage of those employed in January go to NLF in December	9.0	8.5	5.3	1.6	1.1	1.5	5.7	20.5

Table 2.6(b)

Labour Force Status in 1986 in Canada: Females

LF Status in January	16	17-19	20-24	25-34	35-44	45-54	55-64	65-69
Employed	22.0	37.2	60.8	64.3	64.9	58.7	34.7	8.1
Unemployed with job search	2.2	5.2	6.87	5.0	4.2	3.9	2.2	0.2
Unemployed without job search	3.7	2.7	2.3	1.4	1.6	1.2	0.9	0.2
Not in the labour force	72.0	54.9	30.2	29.3	29.3	36.2	62.2	91.5
Percentage of those employed in January go to NLF in December	6.7	12.2	8.1	6.3	3.7	3.5	7.6	27.0

of holiday between jobs, and were therefore not unemployed in either of the two senses discussed above.

Table 2.6 presents the labour force status of each age cohort and the rate of labour force withdrawal among age/sex cohorts. The percentage of each cohort who had, although employed in January, withdrawn from the labour force in December rises with age among those over 35. Table 2.6 also indicates that the rather high rate of labour force withdrawal among the cohorts aged over 55.

Panel A of Table 2.7 compares, by age/sex cohort, the characteristics of jobs held in 1986, for those who continued in employment in December 1986 and for those who had withdrawn from the labour force by December.* Those who continued in employment in December had substantially fewer hours per month, on average, than those who withdrew entirely from the labour force by December. One can read this as indicating that people who were initially employed part-time are more likely to continue in employment. Table 2.7(a) is consistent with the hypothesis that many full-time workers make a discrete choice between full-time employment and complete labour force withdrawal. As lines 3 and 4 of Table 2.7(a) indicate, those who withdraw early from the labour force have, on average, lower hourly wage rates.

However, this average may be misleading, since withdrawal from the labour force may arise because of retirement or for other reasons. Table 2.7(b) takes advantage of the fact that individuals were asked why they left each job, and some explicitly stated that they had chosen

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*The comparison is drawn for the first job held by each individual in 1986—for most people this is the only job held in 1986. See Table 4.

Table 2.7(a)

Average Monthly Hours Supplied and Average Hourly Wage Rate in 1986 (Job 1): Canada

	Males				Females			
	16-44	45-54	55-64	65-69	16-44	45-54	55-64	65-69
Monthly Hours Supplied in Job 1								
Employed (Dec.)	138	129	120.5	70	120.5	118.5	107	79.6
NLF (Dec.)	144	137	133	134.5	120	94	109	110
Hourly Wage Rate (Job 1)								
Employed (Dec.)	11.72	15.77	14.13	10.01	9.22	10.59	9.65	9.18
NLF (Dec.)	6.88	12.75	12.83	10.75	6.61	7.67	8.59	7.93
Percentage of Working Population (Dec.)	38.8	9.6	6.6	1	32.9	6.8	3.9	0.4

Table 2.7(b)

Wage Rate, Hours by Labour Force Transition, Jan/Dec 1986

	Retiree		Workers (DEC)		Unemp/NLF (DEC)	
	Males	Females	Males	Females	Males	Females
Average Wage Rate (Job 1)						
45-54	16.79	9.68	15.77	10.59	11.46	7.88
55-64	15.36	11.17	14.13	9.65	11.02	7.53
65-69	11.57	6.97	10.01	9.18	8.63	8.54
Average Hours per Month Supplied						
45-54	143	114	128	117	151	112
55-64	132	136	119	106	143	119
65-69	154	137	69	80	65	88

"retirement".* It compares the wages and hours of those who "retired" andthose who either continued in employment or who were jobless (i.e., unemployed or not in the labour force) in December of 1986. It appears that "retirement" for men is an option chosen by those who have higher average hourly wages when employed, but that the unemployed and those who left the labour force for other reasons had relatively low hourly wages while employed. No clear pattern in hourly pay rates is discernible among women. Table 2.7(b) also reinforces our early impression that "retirement" typically occurs from a full-time job.

Table 2.8 presents a more detailed look at the reasons why individuals separated from the job which they held the first of 1986. In view of the widespread social concern with structural adjustment in the labour market, it is interesting to note that less than a fifth of all job leavers, at any age, stated that their departure from their first job in 1986 was due to non-seasonal and economic and business conditions, company moving or going out of business, installation of or conversion to new equipment, sale of the business or other "structural" reasons. These sorts of structural causes for job loss are most important as a cause of job loss among the 45 to 54 age group.

The single most important reason for job mobility in Canada, at all ages, is the expiry of a temporary or seasonal job. A substantial proportion of job mobility in the Canadian labour force is therefore "structural", but not in the sense that it represents structural change in employment. However, adding together the structural, temporary/seasonal

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*"Retirement" is a subjectively defined response in the Labour Market Activity Survey and some individuals who stated that they had "retired" in fact took subsequent employment.

Table 2.8(a)*

Job 1 Leaving Cause in 1986 in Canada: Males

Cause	16-44 %	45-54 %	55-64 %	65-69 %
Structural	12.9	18.4	14.7	1.1
Temporary/seasonal	24.6	35.8	29.6	15.3
Dismissal	5.2	6.2	5.2	0.3
Sub-Total "Demand Side"	42.7	60.4	49.5	16.7
Personal	21.8	8.7	13.8	6.4
Dissatisfaction	15.7	7.7	2.8	1.1
Weather/Strike	0.5	0.5	0.8	0.4
Retired	0.5	4.6	24.5	70.3
Other Job Loss	1.9	2.7	1.0	1.0
Found a new job	12.0	8.3	3.4	0
Other	5.0	6.8	4.0	4.1

Table 2.8(b)*

Job 1 Leaving Cause in 1986 in Canada: Females

Cause	16-44 %	45-54 %	55-64 %	65-69 %
Structural	8.5	15.4	14.5	1.6
Temporary/seasonal	19.1	25.8	28.2	16.9
Dismissal	3.3	4.6	3.8	0
Sub-Total "Demand-Side"	30.9	45.8	46.5	18.5
Personal	32.8	20.7	18.2	1.6
Dissatisfaction	17.9	13.3	8.8	3.6
Weather/Strike	0.1	0.1	0	0
Retired	0.6	4.7	19.3	52.6
Other Job Loss	1.5	1.9	0.9	0
Found a new job	10.8	9.5	2.1	2.9
Other	5.5	3.9	4.0	6.4

* For definition of categories, see footnote to Table 2.9

and dismissal groups one gets the total number of people whose job leaving was due to the fact that their old job was no longer available to them. Job mobility, for these people, is a "push" phenomenon, which originates on the demand side of the labour market.[10] It is noteworthy that the majority of job separations among those 16-44 arise for "supply-side" reasons such as "dissatisfaction with the job" or "personal reasons"--but the majority of the job separations of older workers are due to the unavailability of previous employment.

Younger workers are particularly likely to leave a job for personal reasons, or due to dissatisfaction with pay, opportunities for advancement or the use of training, working conditions or job security. As one would expect, retirement is of negligible importance for those under 45 years of age, but increases rapidly in importance over the subsequent cohorts. About 5% of men aged between 45-54 who leave their jobs retired in 1986, while about a quarter of all departures among 55-64 year old men and 70% of job leavings among those over 65 are for the stated reason of "retirement". Retirement is less important as a reason of job leaving among female workers. About a fifth of job leaving in the 55-64 age cohort and approximately a half of all departures is due to retirement.

Part of the social concern with the job loss of older workers is due to the suspicion that such job loss may be particularly costly for older workers. Tables 2.9a to 2.9d therefore present, for each age and sex cohort, a breakdown of the labour market outcomes experienced by job leavers, broken down by the reason for job leaving.

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[10]Section 3.2 combines these reasons for job-leaving into the dummy variable 'DEMAND' which is highly significant as a determinant of labour force withdrawal.

Among, for example, both men and women aged 45-69, those who lost their jobs for structural adjustment reasons were, compared to other job labours, losing jobs with high hourly wage rates and relatively high hours per month. They were also more likely to end the year unemployed than were those who left their jobs for such voluntary reasons as personal considerations, dissatisfactions, retirement or the finding of a new job. "Demand side" job loss, either for structural adjustment reasons or because of the expiry of a seasonal or temporary job, is clearly associated with very long spells of job search and a high probability of ending the year still unemployed.

As Table 2.8 indicates, one must look to the demand side of labour markets--i.e., to structural adjustment, the expiry of temporary or seasonal jobs or dismissal--for the predominant cause of job leaving, especially among older cohorts.—Among men aged 45-54, for example, 60.4% of job leavers left their initial job because it was no longer available to them. Such involuntary job mobility has, as its primary consequence, long spells of unemployment. There is quite a variation in the wages and hours job leavers succeed in obtaining in their second job, compared to their first, but those structural job losers who find a second job have, on average, only slightly lower hourly wages, and most get roughly the same hours as before. In short, unemployment <u>not</u> underemployment or lower wages--is the primary cost of involuntary job loss.

By contrast, voluntary job leavers have a very different experience. Their total weeks of job search are dramatically lower, far fewer of them are unemployed at the end of the year and they typically

experience a substantial increase in hourly wage rates in their subsequent employment.

In summary, simple cross-tabulations tell a simple story. Most older workers have many years of seniority on their job and are unlikely to change jobs. Those who leave their jobs after the age of 65 do so, generally, in order to retire but between the ages of 45 and 64 job-leavers are, generally, job-losers. Such people face very long spells of unemployment and as a consequence, unemployment among older Canadians is highly concentrated. There is little evidence of a gradual "tailing off" of hours of work as people age and a good deal of evidence that the transition is usually fairly abrupt--from full-time employment to unemployment or not in the labour force.

Table 2.9(a)

The Fate of Job 1 Leavers (Males 45-69)

Reason For Leaving Job 1*

	All	Structural	Personal/ Dissatisfaction	Temporary/ seasonal Job	Retired	Found New Job	Other
Average Hourly Wage (Job 1)	14.63	13.23	12.13	11.56	13.07	10.55	15.07
Average Monthly Hours Worked (Job 1)	124.2	147.2	144.2	150.7	140.1	132.7	120.7
LF status (Dec.) (%)							
Employed	67.4	47.9	47.9	41.9	23.2	79.9	70.5
Unemployed (search)	4.9	45.0	10.0	37.0	7.8	10.9	2.5
Unemployed (No search)	0.9	1.0	2.8	5.7	1.3	0	0.7
NLF	26.7	6.1	39.2	16.0	67.6	9.1	26.3
All Jobleavers total wks searching 1986	2.86	15.58	6.0	16.48	2.82	4.53	1.94
Average Hourly wage if holding Job 2	13.79	12.95	16.31	12.02	10.72	16.47	13.26
Job 2 hourly wage (%)							
> Wage Job 1 + $0.5	48.3	34.1	71.3	36.1	57.9	62.2	44.0
Wage Job 1 ± $0.5	30.4	24.1	10.6	32.4	20.4	27.6	15.2
< Wage Job 1 - $0.5	21.3	41.8	18.1	31.5	21.8	10.2	40.7
Job 2 average (%) monthly hours							
> Hours Job 1 + 5	32.8	24.8	22.6	27.6	0	39.9	38.3
Hours Job 1 ± 5	33.5	53.1	44.1	43.0	14.8	41.8	23.3
< Hours Job 1 - 5	33.8	22.2	33.4	29.4	85.2	18.3	38.5
If Employed in Job 2 Wks of Joblessness from Job 1 to Job 2	10.13	14.18	7.8	10.95	8.05	2.44	10.87

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*Note: Structural includes non-seasonal economic and business conditions, company going or moving out of business, installation of or conversion to new equipment, sales of the business or farm, other. Personal includes own illness or disability, personal or family responsibilities, going to school, quit job for no specific reason, change residence, unpaid vacation; dissatisfaction includes low pay, no opportunity for advancement, no opportunity to use training skills, working conditions, worrying about layoff, job security or reduction in hours.

Table 2.9(b)

The Fate of Job 1 Leavers (Males 16-44)

Reason for Leaving Job 1*

	All	Structural	Personal/ Dissatisfaction	Temporary/ seasonal	Retired	New	Other
Average Hourly Wage (Job 1)	11.09	9.95	7.35	8.53	8.90	9.12	12.32
Average Monthly Hours Worked (Job 1)	138.33	153.93	144.39	156.20	161.26	139.34	134.36
LF status (Dec.) (%)							
Employed	79.7	62.6	50.7	48.6	34.5	89.0	87.8
Unemployed (search)	8.3	29.7	13.1	31.4	20.6	4.1	4.3
Unemployed (No search)	0.9	1.3	1.1	3.3	8.8	0.7	0.6
NLF	11.2	6.3	35.1	16.6	36.1	6.1	7.3
All Jobleavers wks searching	4.89	12.78	6.69	16.21	13.45	2.99	3.19
Average Hourly wage if holding Job 2	9.47	10.26	8.82	8.42	6.45	10.71	9.65
% of Job 2 hourly wage							
> Wage Job 1 + $0.5	48.5	38.8	56.0	36.1	44.2	62.5	40.1
Wage Job 1 ± $0.5	23.5	29.5	20.7	31.7	55.8	20.2	21.8
< Wage Job 1 - $0.5	28.0	31.7	23.3	32.2	0	17.3	38.1
% of Job 2 average monthly hours							
> Hours Job 1 + 5	30.6	21.6	26.1	26.2	55.8	38.7	35.3
Hours Job 1 ± 5	34.7	46.1	39.2	32.3	16.6	42.5	23.9
< Hours Job 1 - 5	34.7	32.2	34.7	41.5	27.7	18.8	40.7
If Employed in Job 2							
Wks of Joblessness from Job 1 to Job 2	8.32	10.94	8.63	8.78	18.76	2.71	9.10

*Note: Structural includes non-seasonal economic and business conditions, company going or moving out of business, installation of or conversion to new equipment, sales of the business or farm, other. Personal includes own illness or disability, personal or family responsibilities, going to school, quit job for no specific reason, change residence, unpaid vacation; dissatisfaction includes low pay, no opportunity for advancement, no opportunity to use training skills, working conditions, worrying about layoff, job security or reduction in hours.

Table 2.9(c)

The Fate of Job 1 Leavers (Females 45-69)

Reason for Leaving Job 1[a]

	All	Structural	Personal/ Dissatisfaction	Temporary/ seasonal	Retired	New	Other
Average Hourly Wage (Job 1)	9.97	8.66	7.89	7.17	9.80	8.47	10.39
Average Monthly Hours Worked (Job 1)	113	123.3	114.9	119	125.2	106.2	111.8
LF status (Dec.) (%)							
Employed	39.2	39.0	38.1	38.5	22.4	90.0	39.2
Unemployed (search)	3.7	46.6	23.3	31.8	7.9	4.5	1.8
Unemployed (No search)	0.8	0.7	2.8	0.8	4.6	0	0.6
NLF	56.3	13.7	35.8	28.9	65.1	5.5	58.4
All Jobleavers wks searching	2.2	17.63	8.72	13.31	3.0	2.17	1.51
Average Hourly wage if holding Job 2	8.21	7.65	7.42	8.35	8.14	7.74	8.89
% of Job 2 hourly wage							
> Wage Job 1 + $0.5	27.5	23.5	22.0	26.3	47.2	29.2	31.1
Wage Job 1 ± $0.5	30.9	27.1	31.3	40.7	14.5	23.5	33.1
< Wage Job 1 - $0.5	41.6	49.4	46.7	33.0	38.3	47.4	35.8
% of Job 2 average monthly hours							
> Hours Job 1 + 5	34.7	10.7	38.3	41.3	0	46.3	34.2
Hours Job 1 ± 5	30.2	34.8	21.4	37.5	0	43.7	27.0
< Hours Job 1 - 5	35.1	54.5	40.3	21.2	100	10.0	38.8
If Employed in Job 2							
Wks of Joblessness from Job 1 to Job 2	12.37	16.14	11.58	14.99	17.16	3.35	15.66

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aNote: Structural includes non-seasonal economic and business conditions, company going or moving out of business, installation of or conversion to new equipment, sales of the business or farm, other. Personal includes own illness or disability, personal or family responsibilities, going to school, quit job for no specific reason, change residence, unpaid vacation; dissatisfaction includes low pay, no opportunity for advancement, no opportunity to use training skills, working conditions, worrying about layoff, job security or reduction in hours.

Table 2.9(d)

The Fate of Job 1 Leavers (Females 16-44)

Reason for Leaving Job 1*

	All	Structural	Personal/ Dissatisfaction	Temporary/ seasonal	Retired	New	Other
Average Hourly Wage (Job 1)	8.75	6.89	6.75	7.53	5.09	6.88	9.64
Average Monthly Hours Worked (Job 1)	119.6	134.8	122.5	130.7	115.5	117.3	117.4
LF status (Dec.) (%)							
Employed	65.0	62.5	48.6	43.3	29.4	88.0	68.6
Unemployed (search)	6.9	25.5	14.1	28.4	39.1	6.9	3.6
Unemployed (No search)	1.2	1.6	1.0	3.0	5.4	0	1.1
NLF	26.9	10.4	36.4	25.4	26.1	5.1	26.7
All Jobleavers wks searching	4.29	10.85	6.61	13.69	14.76	3.15	3.10
Average Hourly wage if holding Job 2	7.87	7.25	7.48	7.57	4.24	8.41	8.42
% of Job 2 hourly wage							
> Wage Job 1 + $0.5	46.0	39.3	49.7	43.7	18.8	54.0	38.6
Wage Job 1 ± $0.5	28.1	31.6	28.6	27.9	81.2	32.7	22.8
< Wage Job 1 - $0.5	25.9	29.0	21.7	28.4	0	13.3	38.6
% of Job 2 average monthly hours							
> Hours Job 1 + 5	35.4	21.6	34.6	26.4	54.5	36.9	42.3
Hours Job 1 ± 5	30.2	47.1	31.8	27.5	17.6	40.4	29.7
< Hours Job 1 - 5	34.4	31.3	33.6	46.1	27.9	22.7	38.1
If Employed in Job 2							
Wks of Joblessness from Job 1 to Job 2	9.07	9.85	10.14	10.00	8.38	2.55	9.89

*Note: Structural includes non-seasonal economic and business conditions, company going or moving out of business, installation of or conversion to new equipment, sales of the business or farm, other. Personal includes own illness or disability, personal or family responsibilities, going to school, quit job for no specific reason, change residence, unpaid vacation; dissatisfaction includes low pay, no opportunity for advancement, no opportunity to use training skills, working conditions, worrying about layoff, job security or reduction in hours.

Chapter 3: Multi-Variate Analysis

In one view of the labour market, economists heed Marshall's maxim that "nature does not make jumps" and consider the supply of labour hours by individuals as the solution of the individual utility maximization problem of choosing the appropriate number of labour hours, given the after tax wage available. Hours of work are seen as a continuous variable, and analysis centers on the marginal influence of changes in wage rates, tax parameters and/or the incentives of the income support system. However, in another view of the world, the labour market is seen as a place where individuals (with particular characteristics) and jobs (with specific hours of work and wages) are matched, implying that an individual faces a series of discrete, not continuous, choices. Looking at things in this way, one expects to observe "large" changes over time in labour market behaviour, since the option of marginal change is not available.[11]

Diagram 3A and 3B may serve to illustrate the issue. Both diagrams are drawn to represent the standard neoclassical labour/leisure choice framework, on the assumption that individuals maximize a utility function of the form $U=u\ (c,l)$ where c represents consumption goods and l represents hour of leisure. In both, it is assumed that some level of non-labour income (v) is available to the individual. In both, the indifference curve u_o (drawn as a solid line) represents an individual's preferences between consumption goods and leisure in an initial period, while the indifference curve u_1 (drawn as a dashed line) represents the individual's preferences in a subsequent period. All that we wish to

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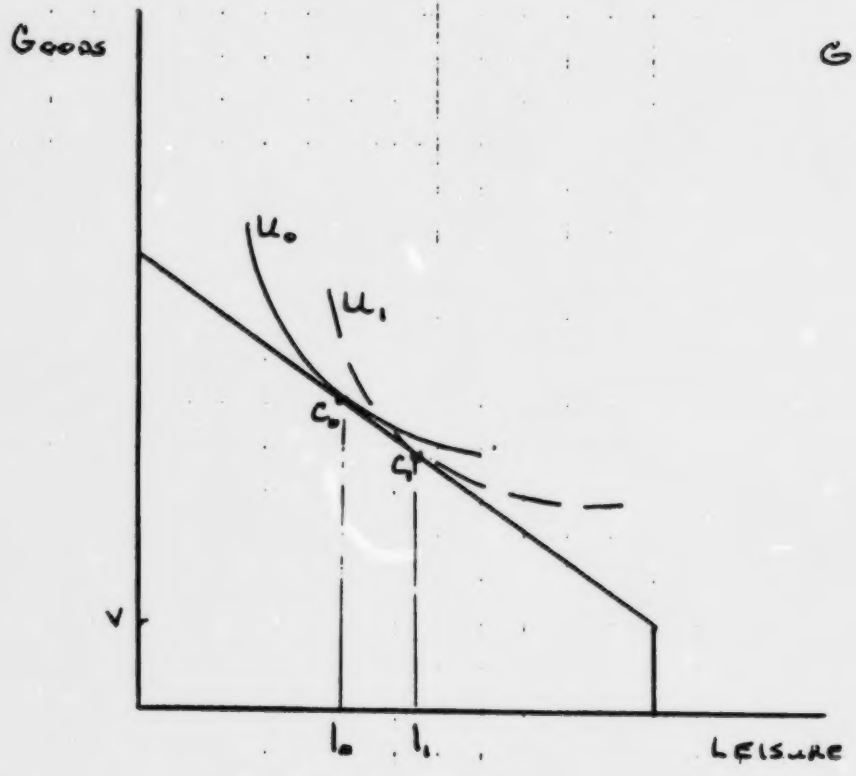
[11]For a recent article in this vein, see Altonji/Paxson, 1988.

LABOUR / LEISURE CHOICE

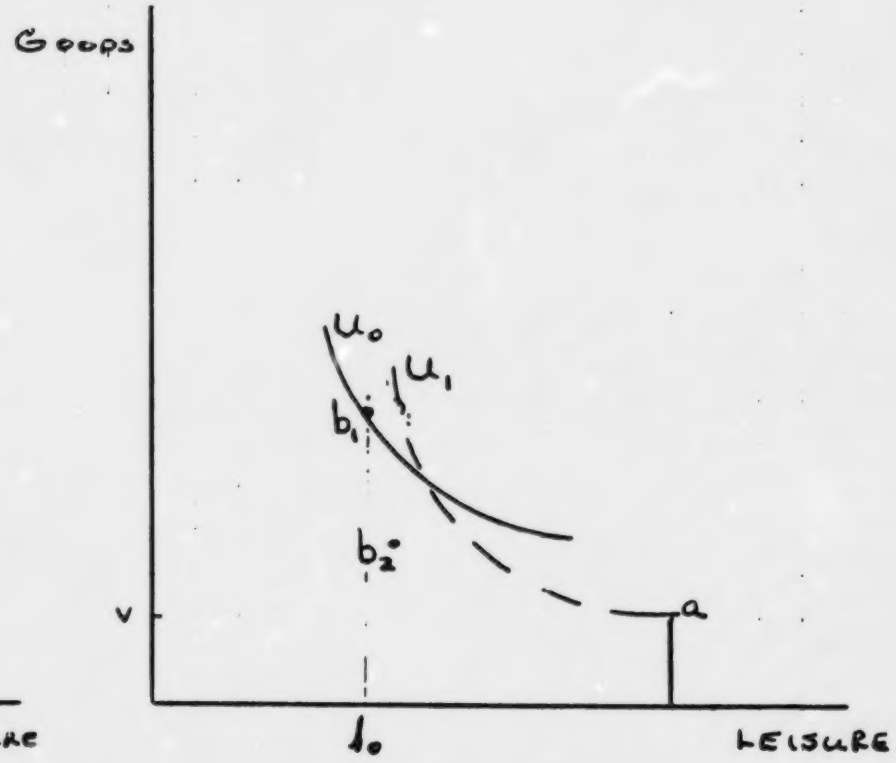
3A

CONTINUOUS HOURS



3B

DISCRETE HOURS



illustrate here is the possibility that as people age, their preferences might shift slightly in favour of consuming more leisure.

The difference between the two diagrams lies in the assumptions they make about the nature of choices available in the paid labour market. In figure 3A it is assumed that the individual can choose how many hours of work to supply to the paid labour market at a given wage rate, hence the set of available alternatives open to an individual can be represented as a solid line AB. In these circumstances, the individual maximizes utility at c_o in the initial period and c_1 in the subsequent period, implying an increase in leisure (decrease in hours of paid work) which can be represented as a shift from l_o to l_1. A small change in preferences as the individual ages therefore produces a small change in observed behaviour. Similarly, a small change in the wage rate would produce a small change in hours of work and it would be appropriate at any point in time to estimate a labour supply function of the form $H = F_1(w)$ where F_1 is a continuous function.

However, figure 3B represents the situation where firms specify both hours of work and wage rates, and an individual must choose between the discrete alternatives of no paid employment (point a) or particular combinations of hours of work and hourly wage rates (represented by points b_1 and b_2). In this case, it is quite possible that an individual who initially maximizes utility at b_1 will, with only a slight change in preferences for leisure, make a complete transition out of paid employment,

since indifference curve u_1 represents preferences for which utility is maximized at point a (complete labour force withdrawal).[12]

In the labour market represented in Figure 3A, the individual faces a continuum of choices, and the disappearance of a particular job is of no great significance. The world of Figure 3(b) is, however, different since the disappearance of a particular alternative (e.g., the non-availability of the job represented by b_1) may produce complete labour force withdrawal.

Although the former view of a continuous labour supply function is a dominant theme in most discussions of labour supply, the issue of "retirement" poses special problems. As Table 2.7 indicates, the average person who retires from the labour force in Canada was holding a full time job immediately prior to their retirement. It is not immediately obvious why an individual's labour/leisure preferences would change so dramatically in such a short period of time. Why do people go directly from 100% labour supply to 0%? Some theoretical work (e.g., Lazear, 1979) argues that the optimal "implicit contract" between workers and firms will carry a mandatory retirement date, but it is not immediately obvious why retirement from a particular employer should preclude part-time work elsewhere for individuals.[13]

This chapter begins by considering multi-variate models of discrete transitions in the labour market and the probability that individuals will

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[12]Killingsworth (1983: pp. 45-66) presents a summary discussion of overemployment and underemployment in labour markets characterized by discrete choices between hours/wages combinations.

[13]Furthermore, although retirement at 65 may be explained by mandatory retirement, or by the financial incentives of retirement income schemes, this report starts from the observation that labour force withdrawal between the ages of 55 and 64 is a growing phenomenon in Canadian labour markets.

be constrained in their supply of hours to the paid labour market. Section 3.1 discusses the determinants of the probability that an individual will retire, or exit the labour force for other reasons. Section 3.2 considers the probability that an individual will be constrained in their annual hours of labour supply. Up to this point, the discussion is consistent with the discrete "job matching" model of the labour market. Section 3.3 considers the probability of underemployment and overemployment. Section 3.4 presents both unconstrained and constrained models of labour supply and argues that one must consider the probability that the observed hours of labour supply of individuals reflect both their desired labour supply and the probability that they will encounter demand side constraints--i.e., not be able to supply all the hours of paid labour which they might desire.

The literature on labour supply is large and complex and it is not really possible, in the time available for this study (or perhaps in a lifetime) to handle all the issues which have been raised in this literature. Readers should therefore be warned explicitly about some of the issues which have been raised in the past but which are not considered here. For example, sections 3.4 uses, as the dependent variable, an individual's total annual hours of paid employment, a formulation that implicitly disregards any distinction in individual preferences between hours of work per day, days of work per week, and weeks of work per year. In the public use sample version of the LMAS data set, individuals are not linked in families, which implies that one can consider only models of individual labour supply, rather than models of family labour supply. Since the exact age of each individual is not observable in the LMAS public use sample, it was not possible to project expected future income if

employed, and thereby consider dynamic models of labour supply. Section 3.4 considers the issue of sample selection bias in observed weeks of work among the employed population, but it does not consider the sample selection bias issues raised by the exclusion of the self employed and NLF populations (which would involve estimation of a bivariate probability density function). No allowance is made for random preference models in the sense of Blundell and Meghir (1986). This report does not claim, therefore to be the "last word" on labour supply issues among older workers in Canada.[14]

3.1 Labour Market Transitions Among Older Workers

Tables 3.1 and 3.2 present estimates of the determinants of the probability that an individual will retire or leave the labour force for reasons other than retirement during 1986. Results are presented separately by age group, because the determinants of probability of retirement or labour force withdrawal differ by age group and by sex. However, the discussion which follows will largely ignore columns 1 and 4 of table 3.1, (i.e., it will focus on the retirement behaviour of workers aged over 55) because very few workers leave the labour force for the stated reason for "retirement" in the age group 45-54 (about one-half of one percent among men and 0.8% among women). By contrast, the annual retirement rate among workers aged between 55 and 64 is about 5% and among

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[14]In the academic literature, it is crucial to ground one's analysis of labour supply issues in an explicit utility maximizing framework, and present a discussion where labour supply functions are explicitly derived from underlying (if unobservable) specification of worker preferences. This can be, and will be, done but meeting a deadline of October 31 imposes some tradeoffs on this report. These sections will be included in later versions of this paper.

those aged 65 to 69 is about 21% -- and is almost exactly the same for both men and women.[18]

Among workers over 65, those who have a full-time job (as opposed to part-time workers) are clearly more likely to retire, but full-time or part-time status is not a significant determinant of retirement among those aged 55 to 64. At the 10% level of statistical significance, one can detect a tendency for male union members 55-64 to retire early. Consideration of aggregate labour demand conditions also seems to play a role in the retirement decision for men between 55 and 64, since the belief that there are "no jobs available" in the local labour market is positively correlated with the probability of early retirement. Pension coverage is also clearly important for the male retirement decision, since coverage by a supplementary pension plan in their job is positively correlated with the probability of early retirement from it. However, it is noteworthy that pension coverage and job availability are statistically insignificant as determinants of the probability of retirement for women workers over 55.

Indeed, one of the main morals of Table 3.1 is the statistical insignificance of many variables which one might have expected to be correlated with the retirement decision. Since a higher current wage rate is surely a disincentive to leaving the labour market, one might have expected that hourly wages would be negatively correlated with the probability of retirement, but there is no correlation at normal

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[18]Tables 3.1 to 3.7 sometimes contain blank spaces. Where a variable had a 't' statistic less than one [i.e., was very unlikely to be statistically significant] and was not a variable of primary theoretical interest (such as the wage or pension coverage in 3.1) it was dropped and the equation re-reestimated. The "slimmed" equations are presented here, but dropping variables in practice made very little difference.

Table 3.0

Definition of Variables

RETIRE	= 1 if leaving Job 1 because of retirement; = 0 otherwise
WAGEJ1	= Hourly wage rate for Job 1
FULLTIME	= 1 if full-time at Job 1; = 0 otherwise
UNION	= 1 if a member of a union or other group which bargains collectively with the employer, or though not a member of a union, wages were covered by a collective agreement negotiated by a union or other group; = 0 otherwise
NOJOB	= 1 if respondent states "a shortage of jobs in the area"; was a labour market difficulty encountered in 1986; = 0 otherwise
SINGLE	= 1 if single; = 0 otherwise
ATLANTIC	= 1 if Newfoundland or PEI or Nova Scotia or New Brunswick resident; = 0 otherwise
QUEBEC	= 1 if Quebec resident; = 0 if otherwise
PRAIRIE	= 1 if Manitoba or Saskatchewan or Alberta resident; = 0 otherwise
B.C.	= 1 if British Columbia resident; = 0 otherwise
PENSION COVERED	= 1 if covered by a supplementary pension plan in addition to CPP connected with Job 1; = 0 otherwise
WORKER'S COMPENSATION BENEFITS	= 1 if received worker's compensation; = 0 otherwise
LF EXIT	= 1 if Employed in January but not in LF in December (excluding retirees); = 0 if Employed in January and employed/unemployed in December
PERSONAL	= 1 if leaving Job 1 because of own illness or disability, or personal or family responsibilities, or going to school

= 0 otherwise

DEMAND = 1 if leaving Job 1 because of seasonal nature of job, non-seasonal economic or business conditions, or company going or moving out of business, or installation of or conversion to new equipment, or an on-call arrangement, end of a temporary non-seasonal job, or dismissal by the employer, or failure of the business or farm;
= 0 otherwise

FTPTJ1 = 1 if full-time at Job 1;
= 2 if part-time at Job 1.

ILLNESS = 1 if leaving Job 1 or wanted but did not work additional hours because of own illness or disability;
= 0 otherwise

PARTTIMER = 1 if full-time at Job 1 and part-time at job 2;
= 0 otherwise

Q62J1 = additional hours preferred to work at Job 1.

MARGINAL WAGE = hourly wageJ1 if one job held;
= hourly wageJ2 if two jobs;
= hourly wageJ3 if three jobs;
= hourly wageJ4 if four jobs;
= hourly wageJ5 if five or more jobs.

UNDER INFORMATION = 1 if "not enough information about jobs" caused trouble when looking for work;
= 0 otherwise

WRONG SKILL = 1 if "not the right skills for available jobs" caused trouble when looking for work;
= 0 otherwise

UNDER EDUCATION = 1 if "not enough education for available jobs" caused trouble when looking for work;
= 0 otherwise

UNDER EXPERIENCE = 1 if "not enough experience for available jobs" caused trouble when looking for work;
= 0 otherwise

JOB SHORTAGE = 1 if "shortage of jobs in the area" caused trouble when looking for work;
= 0 otherwise

FAMILY ALLOWANCE = 1 if received family allowance benefits;
= 0 otherwise

U1 = 1 if received unemployment insurance benefits during 1986;
= 0 otherwise

WELFARE = 1 if received social assistance or welfare benefits during 1986;
= 0 otherwise

PENSION = 1 if received pension income during 1986;
= 0 otherwise

ILL = 1 if could not get a job or stopped working because of own illness or disability;
= 0 otherwise

WANTFUL = 1 if part-time worker reported wanted full-time work;
= 0 otherwise

INDURATE = 1986 unemployment rate for industry of workers job 1.

MOVER = 1 if preferred to worked for fewer employers;
= 0 otherwise

GOVTMISC = 1 if industry belonged to miscellaneous services, or federal administration, or provincial administration, or local administration, or other government offices.
= 0 otherwise

SERVICE = 1 if occupation belonged to protective services; or food and beverage preparation, lodging and accomodation; or personal apparel and furnishing services; or other services occupations.
= 0 otherwise

Table 3.1

The Probability of Retirement in 1986

Dep. Var. = 1 if employed in January and left Job 1 because of retirement

= 0 if employed in January and did not retire

Sample: all persons employed in January

	Males			Females		
	45-54	55-64	65-69	45-54	55-64	65-69
WAGEJ1	0.0058	0.92	0.017	-0.028	0.0075	0.015
	(0.82)	(1.37)	(0.91)	(-1.42)	(0.95)	(0.43)
FULLTIME	0.12	-0.19	0.69	-0.34	0.13	1.09
	(0.44)	(-1.24)	(2.88)	(-0.85)	(0.93)	(3.36)
UNION	-0.055	0.17	0.75	-0.0002	0.18	0.39
	(-0.30)	(1.54)	(3.13)	(-0.0007)	(1.29)	(0.78)
NOJOB	0.98	0.54	-5.37	-0.199	-0.076	-4.58
	(4.62)	(3.11)	(-0.0004)	(-0.37)	(-0.26)	(-0.003)
EDUCATION: None or elementary	-0.57	-0.019	0.19	0.33	0.198	-0.04
	(-2.11)	(-0.18)	(0.93)	(1.59)	(1.27)	(-0.1)
Some post-secondary	-0.42	-0.1	-0.14	-5.07	0.15	0.99
	(-1.02)	(-0.46)	(-0.39)	(-.0002)	(0.63)	(1.99)
Post-secondary cert. or diploma	-5.22	0.36	0.28	-0.39	0.22	-0.47
	(-0.0022)	(2.49)	(0.85)	(-1.06)	(1.26)	(.074)
University	-0.36	-0.03	0.39	0.53	0.59	(-0.031)
	(-1.59)	(-0.21)	(1.43)	(2.37)	(3.39)	(-0.054)
SINGLE	-0.49	0.026	-1.07	-5.43	0.049	-6.56
	(-0.86)	(0.13)	(-1.51)	(-0.0002)	(0.25)	(-0.02)
ATLANTIC	-0.26	0.33	0.65	-0.27	-0.36	-1.598
	(-0.61)	(1.96)	(1.83)	(-0.54)	(-1.22)	(-1.79)
QUEBEC	0.29	0.067	-0.31	0.17	-0.23	-7.16
	(1.60)	(0.56)	(-1.21)	(-0.85)	(-1.38)	(-0.027)
PRAIRIE	-0.23	0.29	0.18	-0.13	-0.13	-0.27
	(I-0.80)	(2.45)	(0.85)	(-0.49)	(-0.86)	(-0.82)
BC	0.081	-0.011	0.08	0.16	-0.21	-5.16
	(0.32)	(-0.074)	(0.28)	(0.62)	(-1.05)	(-0.011)

# OF EMPLOYERS	0.15	0.18	-6.25	-5.22	-0.13	1.19
	(0.71)	(1.32)	(-0.0007)	(-0.0003)	(-0.47)	(1.68)
PENSION COVERED	0.23	0.58	0.44	0.65	-0.085	1.29
	(1.05)	(4.11)	(1.91)	(2.63)	(-0.58)	(2.69)
WORKER'S COMPENSATION BENEFITS	-4.82	-0.23	0.83	0.85	0.24	
	(-0.0011)	(-0.85)	(0.85)	(1.99)	(0.46)	
WORK INTERRUPTIONS	-0.0036	-0.38	-0.83	-0.23	-0.38	
	(-0.09)	(1.69)	(-1.64)	(-0.72)	(-1.66)	
CONSTANT	-2.87	-2.37	4.59	2.9	-1.76	-2.48
	(-8.55)	(-11.68)	(0.0005)	(0.0002)	(-5.6)	(-2.98)
Log-likelihood function	-138.63	-485.39	-147.34	-124.54	-274.18	-46.96
Log-likelihood ratio test	44.48	86.54	113.19	38.09	29.46	88.52
# of observations	3996	2654	398	2682	1520	177
Dep. Var. = 1	27	133	83	25	61	37
= 0	3969	2521	315	2657	1459	140

significance levels. There is also no detectable trend for the more highly educated to remain at work, despite the often heard hypothesis that the smaller physical demands of white collar employment and the greater job satisfaction which is thought to be characteristic of professional employment might imply a longer working life for the more highly educated.[16] Regional effects are unsystematic. The number of employers, and the number of work interruptions within jobs, were both included as indicative of employment instability, which might be thought to increase the chance of retirement, but these are clearly insignificant.

It is at this point that the constraints proposed by the public use sample of the Labour Market Activity Survey become particularly frustrating. It is hard to believe that the family situation of older workers does not play an important role in the retirement decision (indeed, it is difficult otherwise to explain the difference between men and women workers in the importance of supplementary pension coverage) but individuals are not linked together in households in the public use sample. Since age is only reported in intervals, rather than exactly, we cannot examine the importance of the early retirement provisions of the Canada Pension Plan. Although other analysts (e.g., Stelcner, 1987) have found that ill health is an important precipitator of the retirement decision, table 3.1 can only include the receipt of workmen's compensation benefits as a possible proxy for health problems.[17]

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[16]Indeed, among women aged 45 to 64 there is a positive (not negative) correlation between the probability of retirement and possession of a university education.

[17]In the LMAS respondents were asked for the "main reason" why they left each job — i.e., they could specify illness or retirement. Hence, in Table 3.2 following we can use the variable "illness" as a predictor of

3.2 Labour Force Withdrawal

Although Table 3.1 indicates that we cannot get very far in explaining the early retirement decision, one way of rationalizing these results is to ascribe differences in the timing of explicit "retirement" to differences in individual preferences. Early withdrawal from the labour force for other reasons is both more explicable in economic terms and more important for aggregate labour supply. As table 3.2 indicates, in 1986 the rate of labour force withdrawal for reasons other than retirement was 4.4% among males 45-54 and 6.1% among men between 55 and 64 (among women 45 to 54 the annual rate was 7.3% while 9.7% of women 55-64 withdrew from the labour force for reasons other than retirement).

The clearest influence on the probability of labour force withdrawal is the reason for job leaving. As Table 3.2 indicates, those who left their first job for reasons of illness and or because their old job was no longer available to them were were more likely to withdraw from the labour force -- and these effects were consistent, large in magnitude and strongly statistically significant for all age groups and for both men and women.

Other variables are statistically significant for some, but not all age/sex cohorts. Among the oldest cohort (65 to 69) those with only an elementary education were more likely to withdraw from the labour force. University trained males between the ages of 55 and 64 could, at just over the 5% level of statistical significance, be said to be less likely to withdraw from the labour force than other educational groups -- but otherwise education is not statistically significant as a determinant of

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withdrawal from the labour force, but it cannot be used as a predictor of "retirement".

Table 3.2

The Probability of Labour Force Exit in 1986

Dep. Var. = 1 if employed in January but not in Labour Force in December excluding "Retirees"

= 0 if employed in January but employed or unemployed in December excluding "Retirees"

Sample = All persons employed in January excluding "Retirees"

	Males			Females		
	45-54	55-64	65-69	45-54	55-64	65-69
SINGLE	-0.036	0.16	-4.83	-0.10	0.29	-1.54
	(-0.16)	(-.64)	(-0.061)	(-0.48)	(1.59)	(-1.45)
EDUCATION:0						
None or Elementary	-0.56	-0.16	1.19	-0.41	0.26	-0.66
	(-0.47)	(-1.18)	(1.97)	(-2.96)	(1.90)	(-1.09)
Some post-secondary	0.015	-0.56	0.82	-0.20	0.10	-6.79
	(0.069)	(-1.53)	(0.996)	(-1.02)	(0.45)	(-0.09)
Post-secondary cert. or diploma	0.025	-0.078	0.82	-0.12	0.088	0.66
	(0.16)	(-0.35)	(0.94)	(-0.97)	(0.52)	(1.36)
University	-0.14	-0.55	1.15	0.13	-0.45	-1.99
	(-0.84)	(-1.88)	(1.52)	(0.89)	(-1.66)	(-1.58)
FAMILY SIZE	-0.05	-0.14	-1.27	-0.053	-0.046	-0.25
	(-1.01)	(-1.98)	(-2.57)	(-1.25)	(-0.78)	(-0.80)
ATLANTIC	0.091	0.42	0.072	0.084	0.17	0.32
	(0.496)	(1.91)	(0.06)	(0.48)	(0.71)	(0.45)
QUEBEC	0.23	0.29	0.69	0.051	0.31	-1.37
	(1.93)	(1.98)	(1.32)	(0.46)	(2.14)	(-1.58)
PRAIRIE	-0.14	0.15	0.65	-0.027	0.11	-0.044
	(-0.90)	(0.88)	(1.30)	(-0.23)	(0.71)	(-0.096)
BC	0.047	-0.25	0.38	-0.12	0.35	-0.21
	(0.295)	(-1.05)	(0.56)	(-0.82)	(2.02)	(-0.37)
WAGE J1	-0.038	-0.011	0.052	-0.0094	-0.0002	0.079
	(-3.65)	(-0.89)	(1.94)	(-1.00)	(-0.02)	(2.54)
PENSION COVERED	0.0014	-0.036	0.069	-0.49	-0.11	-0.059

	(0.011)	(-0.23)	(0.10)	(-4.21)	(-0.84)	(-0.042)
DEMAND	2.24	2.39	2.98	1.63	2.18	1.68
	(19.52)	(17.13)	(3.21)	(13.41)	(14.25)	(1.13)
FULL-TIME	0.63	0.46	0.062	-0.0004	0.076	-0.39
	(3.596)	(2.42)	(0.13)	(0.0039)	(0.60)	(-0.75)
UNION	-0.073	-0.13	-0.47	-0.046	0.037	0.29
	(-0.62)	(-0.86)	(-0.66)	(-0.42)	(0.27)	(0.23)
ILLNESS	3.52	2.94	3.05	1.81	1.94	2.96
	(9.04)	(14.23)	(3.83)	(7.88)	(9.05)	(3.90)
CONSTANT	-2.13	-2.03	-0.95	-1.25	-1.84	-0.91
	(-10.38)	(-8.67)	(-0.89)	(-7.598)	(-9.16)	(-1.27)
Log-likelihood Function	-392.92	-275.78	-28.46	-539.41	-324.22	-31.96
Log-likelihood Ratio Test	590.22	604.29	60.21	300.02	316.53	56.46
# of observations	3974	2506	324	2662	1459	148
Dep. var. = 1	165	154	14	192	154	21
= 0	3809	2352	310	2470	1305	127

the probability of male labour force withdrawal. There is a detectable tendency for labour force withdrawal to be greater among the males 55-64 in Atlantic Canada and males 45-64 in Quebec (and women 55-64 in Quebec), but these are the only detectable regional influences.

The marital status of individuals is statistically insignificant as a determinant of withdrawal, but the negative coefficient on the family size variable for males over 55 does indicate that those with a greater number of dependents are less likely to withdraw from the labour force. Union membership status has no detectable influence on labour force withdrawal.

If the opportunity cost of leisure is the dominant influence on labour supply, one would expect to observe that those individuals with higher market wages will be less likely to leave paid labour force, while those whose exit is cushioned by pension plan entitlements might be more likely to withdraw from the labour force. Among men aged 45-54, there is a statistically significant negative association between hourly wage rates and the probability of labour force withdrawal, as expected. However, the statistically significant positive relationship between labour force withdrawal and wages for men and women over the age of 65 is puzzling. It is also puzzling that pension coverage has no statistically significant relationship with the probability of labour force exit for males, while among females there is a statistically significant negative association for the age group 45-54.

In labour market analysis, one school of thought emphasizes the importance of the role paid by market incentives, particularly the opportunity cost of leisure, in influencing the desired hours of labour supply of individuals. From this perspective, the unimportance of the

hourly wage rate and of pension coverage as determinants of the probability of labour force withdrawal is a surprising result. However, another school of thought emphasizes the importance of quantity constraints on the actual labour supply of individuals. Illness, or the fact that one's job has disappeared, both represent real barriers to an individuals ability to participate in the paid labour force, and both are highly significant factors in the withdrawal of older Canadians from the labour force.

3.3 The Probability of Underemployment and Overemployment

Table 3.3 presents the determinants of the probability that an individual experienced underemployment in 1986 in Canada. One of the innovations of the Labour Market Activity Survey is that it asks respondents if they were satisfied with their total weeks of work in 1986, and if not, whether they would have preferred to work more or fewer weeks in total during the year.[18] Hence, one can ask the question "what factors determine whether an individual can obtain all the weeks of work which they want?"

Phrasing the issue in this way makes it clear that Table 3.3 should be seen as a "reduced form", which mingles the factors which influence an

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[18]In practice, the construction of the underemployment variable is more complex, since the Labour Market Activity Survey is constructed in such a way that evidence of job search among those who are unemployed at the end of 1986 is taken as indicating a desire for more weeks of work. The skip structure of the questionnaire therefore entails that people who searched actively for work after the end of their last job in 1986 were not asked if they were satisfied with their total weeks of work. The "underemployed" are therefore those who were employed at the end of 1986, but who were dissatisfied with their total weeks of work and indicated that they would have preferred more weeks of work during 1986 plus those who ended 1986 without a job, but who were actively looking for work during their period of unemployment.

Table 3.3

The Probability of Underemployment in 1986

Dependent Variable = 1 if underemployed *

= 0 otherwise

Sample: paid employees

	Males		Females	
	16-44	45-69	16-44	45-69
MARGINAL WAGE	0.049 (4.47)	0.057 (5.57)	0.028 (2.75)	. .
Q62J1	-0.0024 (-1.38)		0.0043 (2.98)	0.0076 (2.86)
PART-TIMER	-0.31 (-1.88)	-0.47 (-1.95)	0.34 (2.51)	0.44 (1.8)
UNDER INFORMATION		0.72 (1.83)	0.74 (5.21)	
WRONG SKILL	0.46 (3.16)	0.37 (1.18)	0.25 (1.86)	
UNDER EDUCATION		1.32 (3.52)		1.64 (4.01)
UNDER EXPERIENCE	0.299 (2.10)	-0.85 (-2.04)	0.33 (2.58)	0.44 (1.40)
JOB SHORTAGE	1.87 (21.4)	2.33 (15.63)	1.68 (18.62)	2.18 (12.77)
ANNUAL EARNINGS	-0.00005 (-10.37)	-0.00004 (-7.36)	-0.00007 (-9.31)	-0.00005 (-4.35)
FAMILY ALLOWANCE	0.75 (3.72)			
UI	1.10 (13.64)	0.85 (6.46)	0.75 (9.18)	1.01 (7.11)
WELFARE	0.43 (2.62)	-0.42 (-1.17)	0.58 (3.53)	0.44 (1.44)
PENSION COVERED	-0.17 (-1.78)			

WORKER'S COMPENSATION BENEFITS	0.29 (1.89)	-0.26 (-0.96)	1.37 (9.26)	
WORK INTERRUPTIONS	0.099 (1.37)	0.38 (3.88)	0.13 (2.09)	0.32 (3.81)
JOB1 TENURE	-0.00022 (-1.13)	-0.0002 (-1.90)	-0.0014 (-4.42)	-0.00017 (-1.00)
ATLANTIC	-0.24 (-1.92)	-0.23 (-1.15)		-0.47 (-1.98)
QUEBEC				-0.36 (-2.03)
PRAIRIE				0.198 (1.20)
B.C.	0.14 (1.21)	0.20 (1.19)		
AGE 16	-0.52 (-2.29)			
AGE 17-19	-0.3 (-2.52)			
AGE 20-24			0.13 (1.43)	
AGE 25-34	-0.26 (-3.18)			
AGE 65-69		-1.73 (-2.29)		-1.97 (-2.12)
EDUCATION:				
Some Post Secondary	-0.35 (-3.17)		-0.28 (-2.48)	-0.49 (-1.56)
Post Secondary Cert. or Diploma		-0.26 (-1.13)	0.12 (1.11)	0.28 (1.38)
University	-0.26 (-1.79)		-0.2 (-1.45)	0.57 (2.60)
ILL	-0.39 (-1.49)	0.44 (1.51)		
WANTFULL	0.13 (1.06)		0.52 (4.80)	0.34 (1.75)

INDURATE	0.029 (3.32)	0.018 (1.13)		
SINGLE		0.64 (3.19)	-0.23 (-2.59)	
MOVER			0.53 (2.70)	
# of DEPENDENT KIDS			-0.17 (-4.11)	
PENSION				0.66 (3.20)
GOVTMISC				0.25 (1.21)
SERVICE				-0.28 (-1.69)
CONSTANT	-1.34 (-6.42)	-1.99 (-9.97)	-1.43 (-7.93)	-2.32 (-7.44)
Log-Likelihood Function	-780.85	-291.08	-739.32	-237.74
Log-likelihood Ratio Test	2463.01	1433.75	1975.89	879.7
Number of Observations	4367	2815	3910	2039
Dep. var. = 1	756	325	631	211
= 0	3611	2490	3279	1828

T-ratios are given in parentheses

* Dependent variable = 1 if not employed but looking for work at end of 1986 or if not satisfied with weeks worked in 1985 and wanted more weeks of work;

= 0 otherwise

underemployment

individual's desired weeks of work and the factors which influence the labour market constraints they may face. Hence, one can analyze the determinants of the probability of underemployment in terms of both incentives and barriers to labour supply. In aggregate, 13.1% of older male employees and 11.5% of older women reported some underemployment, considering the year 1986 as a whole. [For men 16 to 44 the rate was 20.9% and for women 19.2%].

The primary monetary incentive to the supply of labour is the wage rate--in particular, the marginal wage rate (i.e., the hourly wage in the last job an individual held in 1986.) One can explain the positive, and statistically significant coefficients on "marginal wage" as indicative that people want to supply more weeks of work to the paid labour market, the higher the hourly wage rate. Similarly, although the Labour Market Activity Survey does not contain information on the total amount of capital income or transfer payments, it does report the annual earnings of individuals. The statistically significant negative coefficient on annual earnings can be taken as approximately indicative of an "income effect", consistent with hypothesis that (other things equal) those with higher incomes may prefer to consume more leisure.

As regards labour market barriers, respondents were explicitly asked whether not having enough information, skills, education or education for avaulable jobs or a shortage of jobs "caused trouble when looking for work" These responses can be grouped into the categories of "coordination problems", "supply side" issues and "demand side" considerations.

Alhough lack of sufficient information can be a significant problem in locating employment, it does not indicate either the ability of an

individual to supply needed skills to the labour market or the demand of firms for such skills. "Not having enough information about available jobs" may, however, prevent the coordination of individuals' supply and firms' demand, but Table 3.3 indicates that it is only an issue in the underemployment of older males and younger females, and its magnitude is relatively small.[19]

Supply side deficiencies in skill, education, and experience are important determinants of the probability of underemployment, but with significant differences among cohorts. The largest effect was due to "not enough education for available jobs", which is a significant determinant of the probability of underemployment among older workers. Among younger workers, not having "enough experience for available jobs" increased the probability of underemployment, but it is note worthy that older workers did not feel the same way.[20] Finally, those who reported that "not having the right skills for available jobs" caused trouble when looking for work were more likely to report underemployment--but this effect was only statistically significant among younger workers.

In the Labour Market Activity Survey, the questions on information, education, skill and experience were all phrased in terms of whether these factors presented barriers to locating available jobs. This leaves the simple possibility that difficulties in locating employment were due to "a shortage of jobs in the area". Both in terms of the magnitude and the statistical significance of the coefficient, job shortage stands out as the

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[19]For an extended discussion of job search and unemployment in Canada in the 1980's see Osberg (1988b).

[20]Indeed, among male workers aged 45-69 there was a negative correlation between underexperience and the probability of underemployment.

most important variable determining whether an individual experienced underemployment during 1986.

Although the Labour Market Activity Survey does not contain data on the amount of non-labour income received, it does record whether individuals received particular types of transfer payments. And there are two divergent expectations about the relationship between transfer payments and labour supply, which can be labelled, for convenience, the "incentives" and the "casualty" perspectives.

From the perspective of "incentives" to the voluntary supply of labour hours, unemployment insurance and welfare payments represent disincentives to labour supply, since they decrease the cost of remaining jobless. From this perspective, one would therefore expect that those in receipt of such benefits would, other things being equal, decrease their desired weeks of labour supply, and therefore should be less likely to report underemployment. If one looks at transfer payments in terms of their incentives to the voluntary supply of paid labour, one would therefore expect to find a <u>negative</u> correlation between the receipt of unemployment insurance or welfare and probability of underemployment, since transfer payments cause a decrease in the desired labour supply of individuals.

A "casualty" model of the labour market reverses this causal sequence. It argues that the existence of constraints on available weeks of work forces people to rely on unemployment insurance and welfare. From this perspective, those who face greater constraints on available weeks of work will be more likely to become dependent on unemployment insurance and welfare, hence there will be a <u>positive</u> partial correlation between the receipt of unemployment insurance or welfare and the probability of

underemployment, since those who receive U.I. or welfare are those who experience greater constraints in the labour market.

Table 3.3 reveals, in fact, that the receipt of unemployment benefits is highly statistically significant and positively correlated with the probability of underemployment for all age/sex cohorts. Similarly, the receipt of welfare payments or workers' compensation benefits is statistically significant and positively correlated with the probability of underemployment for both male and female workers under the age of 45 (but statistically insignificant among older workers). Again, we have another indication of the importance of labour market constraints.

Overemployment (i.e., working more weeks than one would really like to) represents another form of labour market constrained. Table 3.4 presents estimates of the determinants of the probability of overemployment. Since for some (the underemployed) observed weeks of work are less than desired weeks of work but for others (the overemployed) observed weeks of work exceed desired weeks of work, estimation of a labour supply function is faced with the problem of a double truncation of the dependent variable. A labour supply function represents the relationship between desired labour supply, wages and other independent variables, but double censorship of the dependent variable poses particular econometric problems. In this paper, the methodology used for estimation of labour supply functions in the presence of double truncation of the dependent variable uses the methodology developed by Nakamura and Nakamura (1983 especially pages 252-256).[21] As Table 3.4 indicates, overemployment is in

[21]Mathematical derivation can be found in Nakamura and Nakamura (1983:253/254). The procedure starts with estimation of probit models of the probability of censoring (i.e., of underemployment - repoerted in Table

Table 3.4

The Probability of Overemployment in 1986

Dep. var. = 1 if wanted less weeks of work
= 0 otherwise

Sample: Paid Employees

	Males		Females	
	16-44	45-69	16-44	45-69
Annual Earnings	0.000017			
	(3.82)			
Worker's compensation Benefits	0.49			
	(2.15)			
Atlantic			-0.91	
			(-1.71)	
Quebec	0.134	-0.67	-0.87	
	(0.98)	(-2.08)	(-3.19)	
Prairie			-0.29	
			(-1.57)	
BC		-.037	-0.31	0.45
		(-1.22)	(-1.32)	(2.15)
Age: 17-19	0.59			
	(2.12)			
20-24	-0.55		-0.35	
	(-1.59)		(-1.55)	
25-34	0.23		-0.298	
	(1.65)		(-1.97)	
Education:	0.47			
Some post-secondary	(3.12)			
Post-secondary cert. or diploma			0.44	
			(2.12)	
University	-0.64	0.43	0.24	
	(-2.43)	(2.47)	(1.40)	
Want part-time work	-0.84	0.396		
	(-1.79)	(1.07)		

3.3 - and of overemployment - reported in Table 3.4). From these probit models one calculates inverse Mills ratios, to include in an OLS estimate of the labour supply function.

Total hours worked	0.000099 (1.24)	0.00026 (2.67)	0.00019 (2.48)	
Indurate	-0.062 (-2.03)		-0.055 (-1.28)	-0.14 (-2.44)
UI Benefits				-0.896 (-1.42)
Welfare				0.95 (2.55)
Marginal Wage			0.027 (2.22)	
Pension covered		0.29 (1.44)	-0.18 (-1.16)	
Job 1 Tenure		-0.00028 (-1.65)	0.00028 (1.07)	
Constant	-2.62 (-7.66)	-2.93 (-9.79)	-2.18 (-5.39)	-1.39 (-3.14)
Log-likelihood function	-213.39	-125.26	-185.06	-102.92
Log-likelihood Ratio Test	80.9	26.77	50.67	22.94
Number of observations	4367	2815	3910	2039
Dep. var. = 1	46	24	37	20
= 0	4321	2793	3873	2019

fact pretty rare among the Canadian Labour Force, since something of the order of 1% of paid employees report "overemployment". However, Nakamura (1988) has recently emphasized that sample selection bias, even among small proportions of the total population, can effect empirical estimates.

Finally, Table 3.5 is included to make the point that very few older workers make a transition from full time to part-time employment. Among those that do, the only statistically significant variable among males is whether they lost their job for demand side reasons. Among women, one can also detect a greater tendency to shift to part-time work among the university educated and because of illness. Certainly one does not find in Table 3.5 any evidence of a trend to voluntary reduction in work hours as individuals age.

3.4 Unconstrained and Constrained Labour Supply

Tables 3.6a and 3.6b present the results obtained when an unconstrained model of labour supply is estimated for Canadian men and women, in the age groups 16-44 and 45-69. The columns headed 1 report the results obtained with a simple linear model of labour supply, while column 2 is the log linear labour supply function and column 3 presents a quadratic labour supply function. Since the quadratic specification allows for terms in the wage and the wage^2 this specification tests for the possibility of a backward bending labour supply curve and nests the simple linear hypothesis. This paper does not discuss in detail the results of Tables 3.6a and 3.6b, since the unconstrained model is a nested hypothesis within the more general model whose results are presented in Table 3.7a and 3.7b.

Table 3.5

Probability of Transition to Part-time work in 1986

Dep. var. = 1 if full-time at Job 1 but part-time at Job 2

= 0 if full-time at Job 1 and Job 2 OR
Full-time Always at Job 1 OR Full-time became unemployed or NLF

Sample = Full-time employees at Job 1 who did not "retire" in 1986

	Males			Females		
	45-54	55-64	65-69*	45-54	55-64	65-69**
Single	-0.16 (-0.39)	0.11 (0.17)		-5.62 (-0.0021)	-0.17 (-0.34)	
Education:						
None or elementary	-0.35 (-1.395)	0.36 (1.195)		0.065 (0.25)	-0.77 (-1.17)	
some post-secondary	0.96 (0.31)	-5.04 (-0.0007)		0.46 (1.59)	0.66 (1.84)	
post-secondary cert. or diploma	-0.06 (-0.22)	-5.30 (-0.0009)		0.22 (0.96)	0.15 (0.33)	
University	-0.087 (-0.32)	0.22 (-0.47)		0.74 (2.88)	-5.21 (-0.0009)	
Family Size	-0.025 (-0.29)	-0.029 (-0.18)		-0.059 (-0.75)	-0.45 (-0.32)	
Atlantic	0.14 (-0.43)	-0.19 (-0.33)		-0.52 (-1.17)	0.36 (0.82)	
Quebec	0.35 (1.63)	-5.32 (-0.0015)		00.32 (-1.38)	-5.16 (-0.0012)	
Prairie	0.061 (0.22)	0.094 (0.26)		0.025 (0.12)	0.066 (0.198)	
BC	0.34 (1.34)	0.51 (1.47)		-0.13 (-0.50_	0.14 (0.33)	
WageJ1	-0.025 (-1.53)	-0.033 (-1.05)		-0.0025 (-0.12)	-0.071 (-1.39)	
Pension covered	-0.10 (-0.52)	-0.29 (-0.83)		-0.45 (-2.27)	0.71 (2.07)	
Retire	-4.65	0.11		-4.6-4	0.48	

	(-0.0004)	(0.16)		(-0.0005)	(0.83)	
Demand	0.27	1.06		0.89	0.19	
	(0.93)	(3.43)		(4.11)	(2.47)	
Union	-0.15	-0.13		-0.11	-0.41	
	(-0.079)	(-0.38)		(-0.54)	(-1.25)	
Illness	-0.068	-4.69		0.93	-4.96	
	(-0.059)	(-0.0004)		(1.96)	(-0.0004)	
Constant	-2.05	-2.11		-1.77	-1.91	
	(-5.38)	(-3.65)		(-5.45)	(-3.36)	
Log-likelihood function	-118.77	-45.97		-147.31	-49.42	
Log-likelihood Ratio Test	12.07	36.29		49.68	26.28	
# of observations	2853	1699	133	1609	830	65
Dep. Var. = 1	21	11	1	36	12	0
= 0	2832	1688	132	1573	818	65

* # of observations at Dep. var. = 1 is too small, regression does not converge.

** # of observations at Dep. var. = 1 is equal to zero.

Since the more general model allows for the possibility of labour market constraint, and since such constraints turn out to be highly statistically significant in all cases, it is the latter results which we prefer and which form the basis for discussion.

Formally, in Tables 3.6 and 3.7 we are comparing the results of specifications of the following general form:

(3.6) $H = f(w, x)$

(3.7) $H = f(w, x, l_1, l_2)$

where H = total hours of paid employment in 1986;

x = a vector of personal characteristics;

w = the marginal hourly wage;

l_1 = the inverse mills ratio calculated from the probability of underemployment

l_2 = the inverse mills ratio calculated from the probability of overemployment.

If l_1 and l_2 were statistically insignificant, then one could conclude that nothing was added to our explanation of labour supply by consideration of the probability of labour market constraint--hence one should prefer the simpler formulation of Table 3.6. However, this is clearly not the case. The inverse mills ratios calculated from the probability of labour market constraint are highly statistically significant in all specifications.

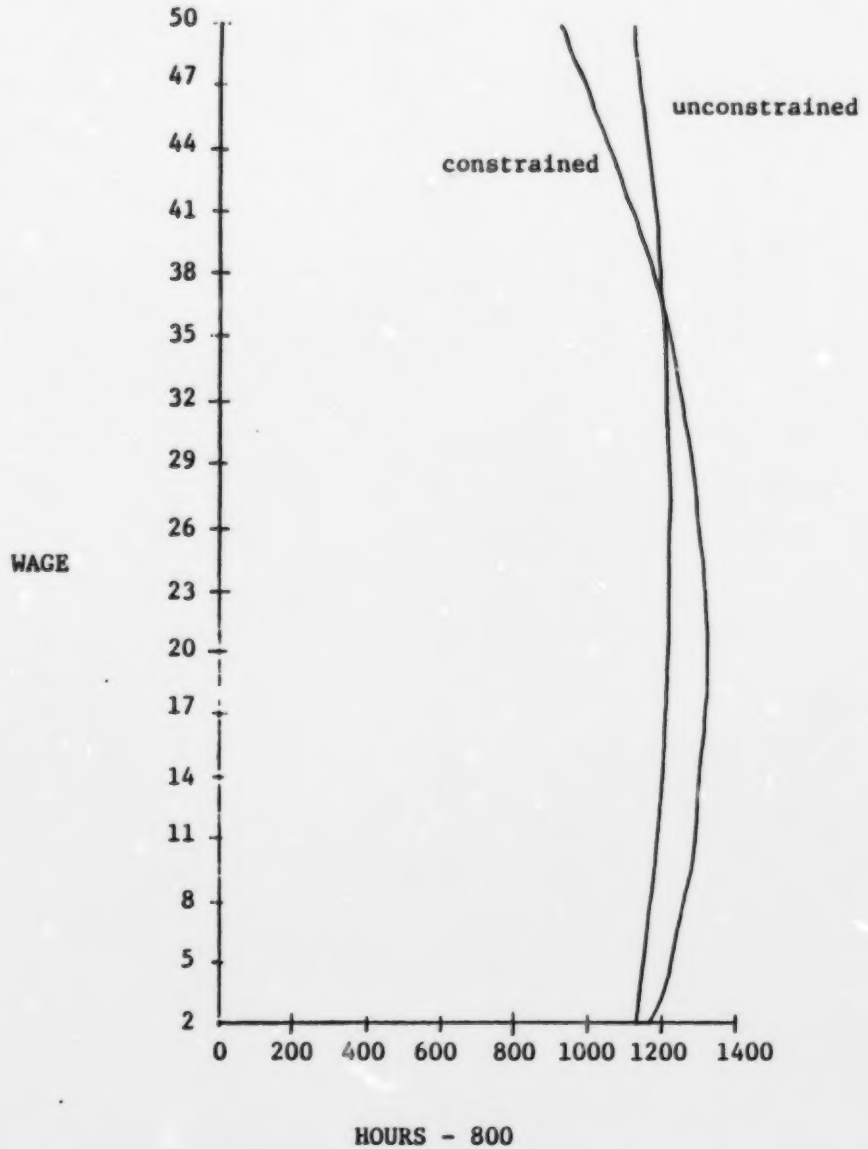
In addition, it is not worthy that the inclusion of correction terms for labour market constraint massively increases the explained variance of every econometric specification of the labour supply function. For

example, among males the quadratic specification has an r^2 of .28 for men between 16 and 44 years of age and .085 for men aged between 45 and 69 if the unconstrained model is used, but the r^2 increases to .49 and .505 respectively once the two sample selection bias correction terms are entered. For women, the increase in explained variance is somewhat lower, from .268 and .135 to .429 and .203--not as large, but still highly impressive.

Although Tables 3.7a and 3.7b include the econometric results obtained for the 16-44 age group, in order to provide a point of comparison, the population of primary interest for this paper is 45-69 year olds. Primary attention therefore focuses on the last three columns of Table 3.7a and 3.7b. In choosing among these specifications of the labour supply function, one can recall that the quadratic specification nests the linear specification, and that the statistical significance of $wage^2$ indicates that the quadratic is to be preferred. Comparing the log linear specification and the quadratic specification, one can note the statistical insignificance of the logarithm of the marginal wage as a determinant of labour hours among older women and the much lower level of explained variance in the log linear specification, compared to the quadratic, among older men. The preferred specification is, therefore, the quadratic labour supply function, which is found in the final column of Tables 3.7a and 3.7b.

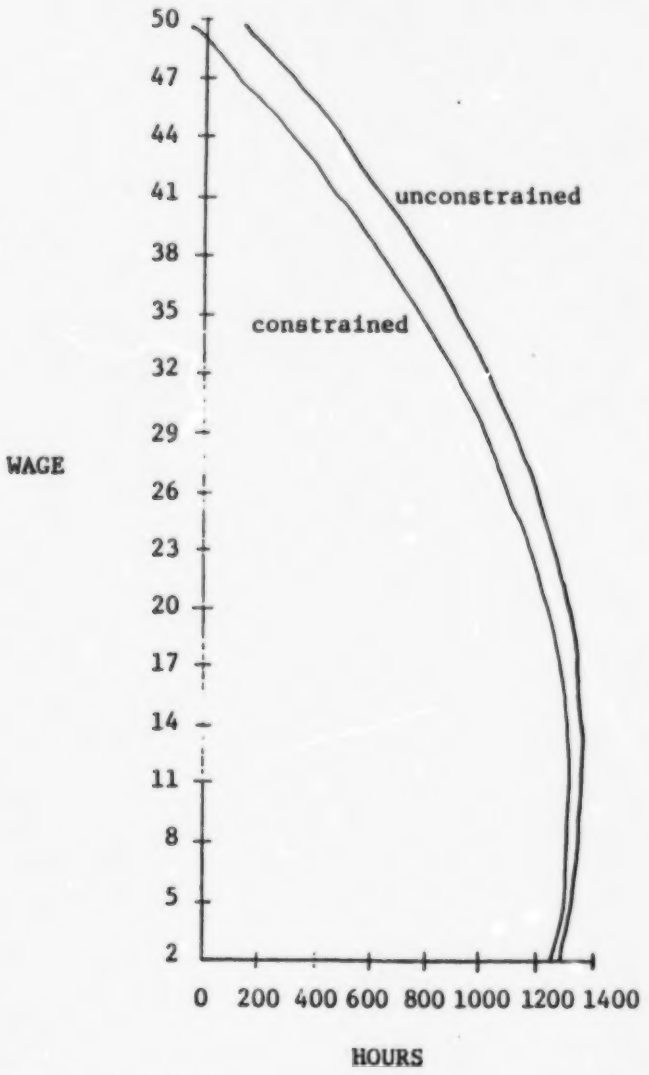
The quadratic specification represents a "backward bending" supply curve of labour for older workers, whose point of inflection is $19.55 per hour for men and $10.11 for women. In other words, at hourly wage rates in excess of $19.55, a further increase in the male hourly wage rate will tend

Hours Supplied and Hourly Wage Rate in 1986



male, 45-54, married, Ontario resident, high-school educated, not covered by a supplementary pension plan in addition to CPP connected with Job 1, mean of Job 1 tenure, mean of number of dependent children.

Hours Supplied and Hourly Wage Rate in 1986



female, 45-54, married, Ontario resident, high-school educated, not covered by a supplementary pension plan in addition to CPP connected with Job 1, mean of Job 1 tenure, mean of number of dependent children.

to decrease desired labour supply, since above $19.55 the income effect (i.e., with higher incomes, individuals can afford to consume more leisure) is greater than the substitution effect (i.e., the greater return to paid employment, at the margin).[22]

Tables 3.7a and 3.7b reveal a clear age effect, since the 55-64 year old group works 130 to 150 hours less per year, other things being equal, then the 45-54 year age group (a control group) and the 65-69 year old cohort works about 450 hours less per year. Long tenure workers have a small, but statistically significant, tendency to work more hours, while those men and women with dependent children tend to work somewhat less. There is no consistent regional effect, and pension coverage and university education appear to have opposite directions of influence for men and for women.

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[22]Among younger Canadians, the quadratic specification receives less support. Given the point estimates of coefficients reported in tables 3.7a and 3.7b, the labour supply function is upward sloping over the entire observed range of hourly wages. Remember that if $H = a + bw + cw^2$, then the point of inflexion is defined by $\frac{H}{} = 0\ b + 2cw$, hence $w = \frac{-b}{}$ is the wage at which the labour supply function bends back. For older men and women, this occurs at reasonable values of the hourly wage, but for men under 45, if b = .08 and c = -.00009 then $-b/2c$ = $888. However, for both younger men and younger women, the linear coefficent (b) is very poorly determined, and if one drops the quadratic term, the linear supply function is backward bending (and highly significant). The moral of the stor is that more work is required on the labour supply of younger workers.

TABLE 3.6(a)*

Labour Supply of Male Canadians in 1986--Unconstrained Models

Sample: Paid Employees with Hourly Wage Rate $2.00-50.00

	16-44*			45-69*		
	(1)	(2)	(3)	(1)	(2)	(3)
MARGINAL WAGE	-0.015 (-0.63)		0.17 (2.71)*	1.42 (0.74)		8.48 (1.51)*
LOG (MARGINAL WAGE)		0.17 (6.04)*			0.15 (6.27)*	
(MARGINAL WAGE)*			-0.00006 (-3.17)*			-0.17 (-1.34)*
PENSION COVERED	119.28 (4.56)*	0.14 (5.33)*	103.41 (3.89)*	115.67 (4.03)*		108.29 (3.70)*
JOB 1 TENURE	0.49 (10.44)*	0.0004 (9.31)*	0.48 (10.34)*	0.27 (7.21)*	0.0002 (9.38)*	0.16 (7.08)*
DEPENDENT KIDS	-37.67 (-3.18)*	-0.043 (-3.74)*	-39.38 (-3.32)*	16.23 (0.89)	0.016 (0.99)	16.31 (0.90)
SINGLE	-294.18 (-9.24)*	-0.25 (-8.41)*	-288.81 (-9.05)*			
AGE: 16	-1131.7 (-13.79)*	-1.53 (-20.59)*	-1090.7 (-13.14)*			
17-19	-604.52 (-11.09)*	-0.55 (-12.9)*	-573.77 (-10.37)*			
20-24	-103.09 (-2.47)*		-91.11 (-2.18)*			
25-34	65.34 (2.23)*		61.79 (2.11)*			
55-64				-165.2 (-6.03)*	-0.17 (-6.92)*	-165.4 (-6.04)*
65-69				-340.24 (-5.29)*	-0.39 (-6.98)*	-335.83 (-5.22)*

EDUCATION:						
NONE OR ELEMENTARY	-116.89		-113.98	-40.96		-37.58
	(-2.35)*		(-2.29)*	-40.96		-37.58
SOME POST-SECONDARY	-146.83	-0.17	-147.2	235.28	0.16	234.77
	(-4.34)*	(-5.07)*	(-4.36)*	(4.33)*	(3.30)*	(4.32)*
POST-SECONDARY CERT. OR DIPLOMA	-8.68	-0.058	-12.37		-0.02	
	(-0.26)	(-1.81)*	(-0.38)		(-0.49)	
UNIVERSITY	6.94	-0.082	9.95	57.32	-0.034	62.96
	(0.198)	(-2.44)*	(0.28)	(1.49)*	(-1.07)	(1.63)*
ATLANTIC	-164.12	-0.16	-156.76	-176.39	-0.16	-173.47
	(-4.04)*	(-4.04)*	(-3.86)*	(-3.67)*	(-3.68)*	(-3.61)*
QUEBEC	-143.39	-0.11	-141.58	-130.11	-0.077	-133.04
	(-5.44)*	(-4.33)*	(-5.38)*	(-4.11)*	(-2.76)*	(-4.19)*
PRAIRIE	-30.56		-30.53	-120.18	-0.11	-120.66
	(-1.01)		(-1.01)	(-3.17)*	(-3.16)*	(-3.19)*
B.C.				-207.81	-0.24	-214.82
				(-5.09)*	(-6.75)*	(-5.23)*
CONSTANT	1870.8	6.19	1748.5	1841.6	7.06	1789.4
	(38.88)*	(32.06)*	(28.35)*	(43.8)*	(107.2)*	(31.26)*
R^2	0.28	0.31	0.28	0.08	0.105	0.085
N	4333	4333	4333	2793	2793	2793
STANDARD ERROR	710.33	0.70	709.59	648.0	0.57	647.9
F	103.85	166.19	98.54	20.88	28.29	19.53

Note: * _____ dependent variable is "total hours worked" for 1 and 3; "log of total hours worked" for 2

t--ratios are given in parentheses
a--significant at 1%
b--significant at 5%
c--significant at 10%

TABLE 3.6(b)*

Labour Supply of Female Canadians in 1986--Unconstrained Models

Sample: Paid Employees with Hourly Wage Rate $2.00-50.00

	16-44*			45-69*		
	(1)	(2)	(3)	(1)	(2)	(3)
MARGINAL WAGE	-0.077 (-2.75)*		0.25 (3.7)*	-4.06 (-0.99)		19.9 (1.81)*
LOG (MARGINAL WAGE)		0.073 (2.03)*			-0.008 (-0.18)	
(MARGINAL WAGE)^2			-0.0001 (-5.2)*			-0.85 (-2.35)*
PENSION COVERED	311.8 (11.5)*	0.3 (9.3)*	283.4 (10.3)*	39.7 (10.4)*	0.45 (11.1)*	379.4 (9.7)*
JOB 1 TENURE	0.74 (13.9)*	0.0009 (13.7)*	0.71 (13.3)*	0.29 (7.2)*	0.0003 (7.2)*	0.28 (7.0)*
DEPENDENT KIDS	-138.1 (-11.6)*	-0.15 (-10.3)*	-136.4 (-11.4)*	-70.8 (-2.13)*		-70.5 (-2.13)*
SINGLE	3.2 (0.11)	-0.036 (-0.98)	9.2 (0.3)	170.54 (2.47)*	0.18 (2.5)*	166.5 (2.41)*
AGE: 16	-899.9 (10.8)*	-1.22 (-12.2)*	-8.50 (-10.2)*			
17-19	-555.5 (-10.7)*	-0.45 (-7.2)*	-514.6 (-9.9)*			
20-24	-81.3 (-2.1)*	0.053 (1.14)	-57.5 (-1.5)*			
25-34	27.0 (0.95)	0.08 (2.37)*	28.1 (0.99)			
55-64				-146.3 (-4.1)*	-0.17 (-4.4)*	-145 (-4.04)*
65-69				-356 (-3.8)*	-0.53 (-5.3)*	-349.3 (-3.72)*

EDUCATION:						
NONE OR ELEMENTARY	-73.8	-0.09	-59.1	53.9		64.8
	(-1.32)c	(-1.36)c	(-1.06)	(1.18)		(1.42)c
NONE POST-SECONDARY	-62.5	-0.07	-76	-28.3	-0.14	-26.4
	(-1.84)c	(-1.83)c	(-2.24)b	(-0.4)	(-1.89)b	(-0.37)
POST-SECONDARY CERT. OR DIPLOMA	95.3	0.08	70.2		-0.02	
	(2.98)a	(2.08)b	(2.18)b		(-0.37)	
UNIVERSITY	59.4	-0.0065	35	137.6		146.2
	(1.60)c	(-0.15)	(0.94)	(2.23)b		(2.37)b
ATLANTIC	-122.9	-0.13	-110.7		-0.17	
	(-2.98)a	(-2.6)a	(-2.69)a		(-2.45)b	
QUEBEC	-93.6	-0.07	-92.5			
	(-3.35)a	(-2.16)b	(-3.32)a			
PRAIRIE	34.5	0.08	34.1			
	(1.08)	(2.05)b	(1.08)			
B.C.	-69.6	-0.13	-72.7	136		138.0
	(-1.8)b	(-2.94)a	(-1.9)c	(2.68)a		(2.72)a
CONSTANT	140.69	6.36	1230.2	1238.5	6.83	1114.4
	(32.2)a	(26.5)a	(22.3)a	(26.8)a	(76.3)a	(15.9)
R^2	0.26	0.26	0.268	0.13	0.15	0.135
N	3870	3870	3870	2017	2017	2017
STANDARD ERROR	675.3	0.8	673	738.7	0.78	737.9
F	82.2	80.9	79.7	29.1	40.9	27.2

Note: a _____ dependent variable is "total hours worked" for 1 and 3; "log of total hours worked" for 2

t--ratios are given in parentheses
a--significant at 1%
b--significant at 5%
c--significant at 10%

TABLE 3.7(a)*

Labour Supply of Male Canadians in 1986--Constrained Models

Sample: Paid Employees with Hourly Wage Rate $2.00-50.00

	16-44			45-69		
	(1)	(2)	(3)	(1)	(2)	(3)
MARGINAL WAGE	-0.23 (-10.86)a		0.08 (1.49)c	-1.43 (-1.01)		17.2 (4.16)a
LOG (MARGINAL WAGE)		0.039 (1.45)c			0.095 (4.48)a	
(MARGINAL WAGE)^2			-0.00009 (-6.28)a			-0.44 (-4.79)a
PENSION COVERED	39.24 (1.77)c	0.06 (2.51)b	13.59 (0.60)	-153.0 (-6.96)a		-174.97 (-7.82)a
JOB 1 TENURE	0.136 (3.37)a	0.00014 (3.38)a	0.13 (3.17)a	0.24 (13.3)a	0.0001 (7.39)a	0.24 (13.2)a
DEPENDENT KIDS	-21.49 (-2.15)b	-0.025 (-2.37)b	-24.42 (-2.45)b	-23.86 (-1.78)c	-0.008 (-0.58)	-24.1 (-1.81)c
SINGLE	-223.19 (-8.29)a	-0.18 (-6.65)a	-212.61 (-7.91)a			
AGE: 16	-1423.3 (-20.43)a	-1.78 (-26.24)a	-1353 (-19.26)a			
17-19	-828.4 (-17.92)a	-0.69 (-17.75)a	-779.2 (-16.69)a			
20-24	-67.1 (-1.9)c		-44.2 (-1.25)			
25-34	-99.6 (-3.96)a		-109.2 (-4.35)a			
55-64				-148.0 (-7.31)a	-0.14 (-6.67)a	-148.8 (-7.38)a
65-69				-485.6 (-10.2)a	-0.46 (-9.48)a	-472.7 (-9.93)a

EDUCATION:						
NONE OR ELEMENTARY	-50.29		-45.6	-24.6		-15.9
	(-1.2)		(-1.09)	(-1.1)		(-0.72)
SOME POST-SECONDARY	-525.69	-0.39	-535.5	145.8	0.09	144.1
	(-17.1)a	(-12.04)a	(-17.48)a	(3.63)a	(2.18)b	(3.6)a
POST-SECONDARY CERT. OR DIPLOMA	-60.63	-0.12	-66.0		-0.05	
	(-2.18)b	(-4.05)a	(-2.38)b		(-1.38)c	
UNIVERSITY	133.25	-0.005	146.32	-546.7	-0.35	-540.1
	(4.31)a	(-2.71)a	(4.74)a	(-16.8)a	(-10.7)a	(-16.7)a
ATLANTIC	-65.65	-0.078	-53.9	-75.2	-0.077	-67.5
	(-1.91)c	(-2.18)b	(-1.57)c	(2.11)b	(-2.08)b	(-1.9)c
QUEBEC	-155.47	-0.11	-154.3	300.8	0.15	298.8
	(-6.97)a	(-4.7)a	(-6.45)a	(11.6)a	(5.47)a	(11.6)a
PRAIRIE	10.88		10.6	-32.5	-0.38	-34.0
	(0.42)		(0.41)	(-1.16)	(-1.29)c	(-1.22)c
B.C.				201.8	-0.018	187.3
				(6.4)a	(-0.54)	(5.95)a
OVERLAMBDA	25963	12.31	26790	61611	28.37	62544
	(27.2)a	(12.93)a	(27.9)a	(35.3)a	(16.2)a	(35.8)a
UNDERLAMBDA	-1329.2	-1.28	-1312.9	-1370.2	-1.18	-1358.9
	(-28.8)a	(-26.24)a	(-28.5)a	(-22.7)a	(-22.7)a	(-27.1)a
CONSTANT	-17351	-1.50	-18230	-46374	-14.6	-47272
	(-22.68)a	(-2.02)b	(-23.5)a	(-32.9)a	(-10.2)a	(-33.3)a
R^2	0.49	0.437	0.49	0.502	0.329	0.505
N	4333	4333	4333	2793	2793	
STANDARD ERROR	598.4	0.64	595.7	478.23	0.495	476.4
F	228.2	240.98	220.2	188.24	98.99	179.3

Note: a _____ dependent variable is "total hours worked" for 1 and 3; "log of total hours worked" for 2

t--ratios are given in parentheses
a--significant at 1%
b--significant at 5%
c--significant at 10%

TABLE 3.7(b)*

Labour Supply of Female Canadians in 1986--Constrained Models

Sample: Paid Employees with Hourly Wage Rate $2.00-50.00

	16-44			45-69		
	(1)	(2)	(3)	(1)	(2)	(3)
MARGINAL WAGE	-0.39 (-14.0)a		0.017 (0.27)	-6.83 (-1.75)c		17.8 (1.69)c
LOG (MARGINAL WAGE)		-0.12 (-3.39)a			-0.011 (-0.28)	
(MARGINAL WAGE)^2			-0.00013 (-7.47)a			-0.88 (-2.53)b
PENSION COVERED	317.6 (13.0)a	0.28 (9.01)a	289.7 (11.8)a	336.6 (9.06)a	0.399 (10.0)a	318.4 (8.4)a
JOB 1 TENURE	0.21 (4.23)	0.0005 (7.6)a	0.16 (3.19)a	0.21 (5.6)a	0.0002 (5.5)a	0.21 (5.4)a
DEPENDENT KIDS	-149.6 (-14.1)a	-0.16 (-12.0)a	-146.4 (-13.9)a	-64.2 (-2.01)b		-63.8 (-2.0)b
SINGLE	-51.9 (-1.91)c	-0.09 (-2.64)a	-42.7 (-1.58)c	178.2 (2.69)a	0.18 (2.6)a	174.0 (2.63)a
AGE: 16	-910.6 (-12.3)a	-1.3 (13.8)a	-834.9 (-11.2)a			
17-19	-517.8 (-11.3)a	-0.46 (-7.9)a	-458.3 (-9.9)a			
20-24	98.7 (2.79)a	0.15 (3.3)a	142.8 (4.00)a			
25-34	221.1 (8.2)a	0.18 (5.2)a	240.2 (8.97)a			
35-64				-131.3 (-3.8)a	-0.15 (-4.3)a	-129.9 (-3.77)a
65-69				-430.5 (-4.8)a	-0.61 (-6.4)a	-423.6 (-4.7)a

EDUCATION:						
NONE OR ELEMENTARY	-79.8 (-1.6)c	-0.09 (-1.5)c	-61.5 (-1.25)	56.1 (1.28)	0.09 (1.94)c	67.5 (1.53)c
SOME POST-SECONDARY	-104.5 (-3.46)a	-0.12 (-3.3)a	-117.98 (-3.9)a	-76.3 (-1.12)	-0.18 (-2.52)b	-74.3 (-1.1)
POST-SECONDARY CERT. OR DIPLOMA	104.8 (3.7)a	0.07 (2.04)b	76.7 (2.699)a			
UNIVERSITY	-118.3 (-3.52)a	-0.11 (-2.70)a	-162.34 (-4.79)a	167.3 (2.8)a		167.3 (2.95)a
ATLANTIC	319.2 (7.9)a	0.14 (2.83)a	361.3 (8.94)a		-0.14 (-2.09)b	
QUEBEC	308.1 (10.1)a	0.14 (3.81)a	341.3 (11.1)a			
PRAIRIE	302.2 (9.8)a	0.22 (5.64)a	324.3 (10.6)a			
B.C.	255.7 (7.1)a	0.086 (1.92)b	267.2 (7.5)a	119.7 (2.26)b		121.3 (2.3)b
OVERLAMBDA	36959 (20.5)a	17.96 (8.42)a	40342 (21.9)a	2695.9 (1.41)c	-2.76 (-1.48)c	2742.9 (1.44)c
UNDERLAMBDA	-1311.6 (-25.3)a	-1.39 (-21.05)a	-1252.3 (-24.0)a	-1200.9 (-12.9)a	-1.25 (12.6)a	-1201.8 (-12.9)a
CONSTANT	-26968 (-18.6)a	-5.52 (-3.32)a	-29981 (-20.1)a	230.49 (0.13)	10.2 (6.7)a	38.7 (0.03)
R^2	0.42	0.346	0.429	0.20	0.21	0.203
N	3870	3870	3870	2017	2017	2017
STANDARD ERROR	598.5	0.75	594.3	709.4	0.75	708.4
F	149.2	108.8	146.6	39.9	51.0	37.6

Note: a _____ dependent variable is "total hours worked" for 1 and 3; "log of total hours worked" for 2

t--ratios are given in parentheses
a--significant at 1%
b--significant at 5%
c--significant at 10%

4. Conclusion

Whether one uses simple statistics or complicated ones, whether one looks at models of discrete labour market transitions or continuous labour supply functions, the data tell a single story - the importance of labour market demand. Although this paper has identified the personal characteristics of older workers which influence the decision to retire, to withdraw from the labour force or to supply fewer hours of paid work, it also concludes that a major determinant of the reduced labour supply of older Canadians in recent year is the lack of labour demand - as evidenced in the disappearance of jobs and the lack of available replacements. In one sense, this is an optimistic finding, since it implies that the aging of the "baby boom" generation need not be accompanied by lower labour force participation rates and a lower warranted rate of growth of the Canadian economy. From the point of view of equity, however, it is disquieting to conclude that for older Canadians labour force withdrawal is so often involuntary unemployment rather than voluntary retirement.

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